User Manual for the CR:110A doseBadge Personal Noise Dosemeter & RC:110A Reader Unit

Cirrus Research plc

dedicated to noise measurement

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Rev. 09 Dual Channel

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Preface

Guidelines for Safe & Efficient Use

Please read all sections of this manual before attempting to use the instrument.

Warnings

This symbol is used throughout the manual to indicate that special attention should be taken and any instructions followed carefully. Information covered in these sections relates to operations that are vital to the efficient use of the instrument.

What's new in the CR:110A doseBadge and RC:110A Reader Unit

This User Manual refers to the CR:110A doseBadge Personal Noise Dosemeter, the RC:110A Reader Unit and the CU:110A Charger Unit shipped from the Cirrus Research plc factory after the 30th February 2007.

Please note that this manual does not refer to any previous version of the doseBadge Personal Noise Dosemeter. For operating instructions and user manuals for any previous version or variant, please contact Cirrus Research plc or your local representative.

There are several major technical differences between the CR:110A doseBadge and the previous versions. Please ensure that all sections of this manual have been read before using the equipment.

For users who have previous experience of the doseBadge, the following information is essential and should be read carefully before use.

The additions to these versions of the doseBadge, Reader and Charger are as follows:

1) Dual Channel Measurements

The software inside the CR:110A and CR:110AIS doseBadges and the RC:110A Reader Unit have been upgraded to allow the doseBadge to measure two channels at the same time.

Channel 1 can be set to any configuration such as OSHA, MSHA, AICHE, ISO etc and Channel 2 is fixed to be 3dB ISO.

Both channels measure and record at the same time and data is downloaded for both channels to the Reader Unit. Both channels will log and store 1 minute Noise Profile (Time History) data including Peak(C) levels.

2) New CU:110A 5 Way Charger Unit with 2 ½ hour maximum charge time

i) The new 5 Way CU:110A Charger Unit replaces the 2, 5 and 10 way chargers.
ii) The maximum charge time is 2½ hours
iii) Measurement kits with 1, 2 and 5 doseBadges have 1 x CU:110A Charger.
iv) Measurement Kits with 10 doseBadges have 2 x CU:110A Chargers with a connecting cable.

v) Fully compatible with all previous doseBadge and battery variants

3) % Dose Flashing Light
The indicator LED on the doseBadge can be set to flash quickly when the 100% Noise Dose value is exceeded on Channel 1

doseBadge Configuration

The CR:110A doseBadge can be configured to meet the requirements of many different Occupational Noise and Industrial Hygiene Regulations and Guidelines.

The Dual Channel capability allows the doseBadge to be used, for example, where there is a requirement to measure noise exposure in accordance with both OSHA and ISO standards.

Please ensure that the RC:110A Reader Unit is configured for the correct functions and parameters before making measurements with the doseBadge.

The dBLink3 software can be used to configure the doseBadge and Reader unit to meet these requirements. Please refer to the dBLink3 software for further information.

doseBadge Battery Performance

The NiMH rechargeable battery within the CR:110A doseBadge is designed to be recharged using the supplied battery chargers. Do not attempt to charge the doseBadge battery by any other means.

Before the first use

Before the doseBadges are used for the first time ensure that the units are allowed to fully charge which may take up to 6 hours.

Recharging the battery

Ensure that the instructions detailed in this manual are followed carefully when charging the doseBadge units. To ensure optimum operation, the doseBadge may be left on trickle charge when not in use.

Storage of the doseBadge

The doseBadge should be stored in a fully charged state. If the CR:110A doseBadge is not used for 1 hour, it will shutdown and go into sleep mode.

To wake the doseBadge from the Sleep mode, shake the doseBadge until the indicator light shows. Refer to **“Shake-to-Wake” function** on **Page 22** for detailed information about this function.

The “Shake to Wake” function has been added to the CR:110A doseBadge to ensure that a doseBadge that is not in use powers down to the minimum possible power consumption.

The doseBadge should be kept on the charger unit when not in use to ensure optimum performance. The doseBadge should be charged at least every 14 days to maintain this optimum performance.

Battery Operating Life

The doseBadge system should be returned to Cirrus Research plc for calibration and servicing. During this calibration and service, the performance of the internal battery will be verified.

Installing the doseBadge Software

The doseBadge system is supplied with the dBLink3 Download and the dBase Database software packages.

dBLink3 is a program that allows measurements to be downloaded from the RC:110A Reader unit to a PC. The dBLink3 software automatically recognises an RC:110A Reader unit and allows measurements to be downloaded.

dBLink3 and the doseBadge Database are supplied on a CD-ROM and require a PC running Microsoft Windows95 or later. Install the software before connecting the doseBadge Reader Unit to the PC.

To install the software**:**

1. Insert the Disc in the CD-ROM drive
2. Follow the instructions on the screen

If the installation program does not automatically start, run d:\setup.exe program from the Start, Run option in the task bar where d is the letter of the CD-ROM drive.

Please note that if you are running on a network, you may need to contact your network administrator to ensure that you have sufficient access rights to install this software. This software should be installed with full administration rights to ensure that the configuration of the software can be completed.

Cirrus Research plc accepts no responsibility for the installation of this software on systems where full access rights are not available.

Section 1 Introduction

Thank you for purchasing the doseBadge Personal Noise Dosemeter System from Cirrus Research plc.

The doseBadge is a unique solution to the problems associated with the measurement of Personal Noise Exposure. The doseBadge itself has no controls or cables which means that the unit can be used in situations where the wearer is working in confined spaces or where there is a risk of a cable being caught in machinery.

Measurements are downloaded from the doseBadge to a Reader unit via an infra-red link which removes the need for keys or controls on the instrument.

This version of the doseBadge, the CR:110A and the RC:110A Reader Unit, provide a range of configuration options which allow the system to be used to measure and record noise levels to most Occupational Noise and Industrial Hygiene Regulations.

The CR:110A doseBadge and RC:110A Reader Unit, when used with the dBLink3 software, provide Dual Channel Measurements.

Channel 1 can be configured to be any combination of the Exchange Rate (Q), Criterion Level (CL), Criterion Time (CT), Threshold (TH) and Time Weighting (TW). Channel 2 is preset to a 3dB ISO configuration as shown below:

Parameter	**Configuration Options**	
	Channel 1	**Channel 2**
Exchange Rate (Q)	3dB, 4dB or 5dB	3dB
Criterion Time	8hrs, 12hrs, 16hrs or 18hrs	8 hours
Criterion Level	80dB, 85dB or 90dB	85dB
Threshold	None, 80dB or 90dB	None
Time Weighting	None or ‘S’ (Slow)	None

All of these configuration options can be selected from the RC:110A Reader Unit. In addition, the dBLink3 software allows user defined configurations to be loaded into the Reader Unit. The software includes preset configurations such as ISO, OSHA, ACGIH and US ACHPPM.

A system can be started with a single doseBadge and a Reader unit, and expanded by purchasing additional doseBadges and the appropriate number of charging units. A range of additional external charging units allow a system to be expanded simply and easily without any of the components becoming obsolete.

This manual describes the operation of the CR:110A doseBadge unit and RC:110A doseBadge Reader.

Also described are the optional RC:101A Keyfob Remote Control and the UA:100 Windshield. The Keyfob allows the doseBadge to be started and stopped without the RC:110A unit, and should be ordered separately.

Please note that the RC:110A Reader unit supports all previous versions of the doseBadge Personal Noise Dosemeter. However some features and functions may not

be available when using the RC:110A Reader with previous versions (CR:100A or CR:100B) of the doseBadge.

Please refer to “Checking the Configuration” on page 18 and “Configuration of the Measurement Parameters” on page 37 for more information. Also refer to Section 7 **“Troubleshooting”** on page 51.

How the doseBadge works

The doseBadge is controlled by the Reader unit through an infrared link. The link between the doseBadge and the Reader is used to send information in a similar way to a television remote control.

The RC:101A Keyfob also provides a method to start and stop the doseBadge without using the Reader unit.

Each doseBadge contains a rechargeable battery which powers the unit throughout the measurement period. Each charge of the battery is designed for one measurement.

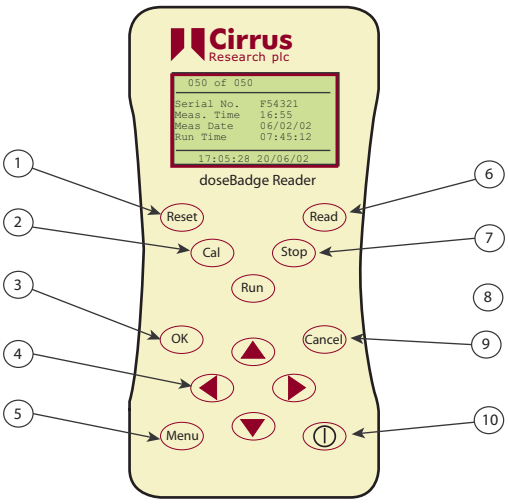
The battery contains sufficient power to carry out a single measurement for over 20 hours although the doseBadge will run for much longer provided the battery is fully charged.

Please note that although the RC:110A Reader unit can be used to control the previous CR:100A and CR:100B doseBadges, if the user attempts to program an older doseBadge with a configuration that is not supported, an error message will be displayed when the doseBadge is reset or data is read from the doseBadge.

Section 2 Layout & Controls

RC:110A Reader Unit

The figure below shows the layout of the RC:110A Reader Keypad.

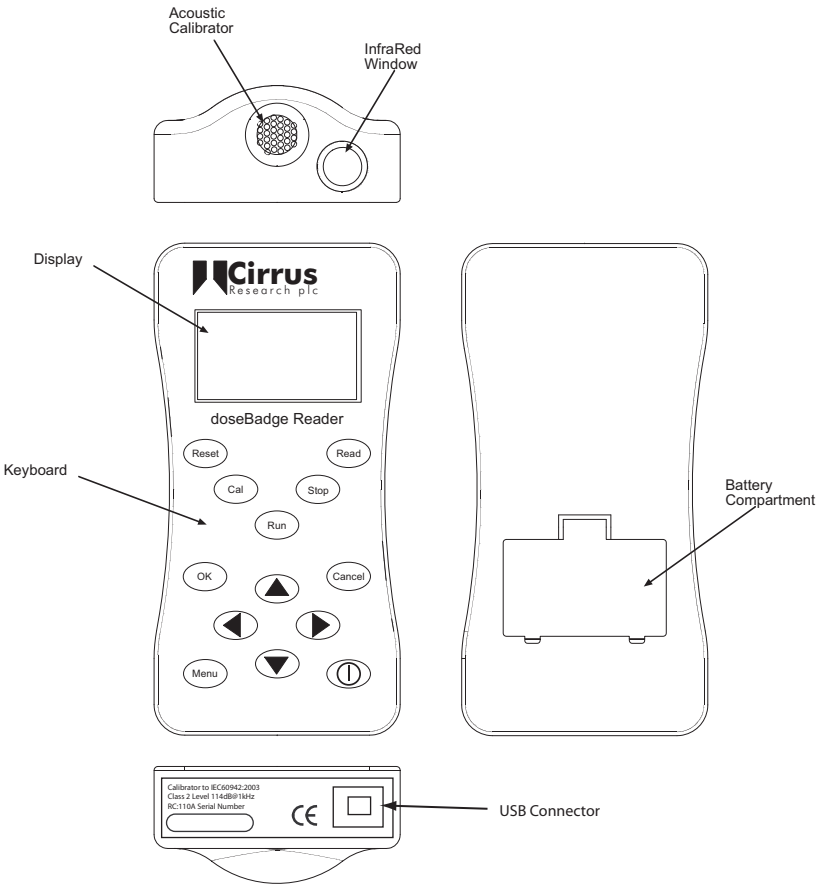


The RC:110A Reader unit has an integral Acoustic Calibrator that has been specifically designed to suit the unique shape and performance of the doseBadge. The Acoustic Calibrator is located on the top of the Reader unit.

Next to the Acoustic Calibrator is the InfraRed Port which is used to communicate with the doseBadge.

The battery compartment is located on the rear of the Reader unit. The USB connector which is used to download data to a PC is located on the bottom of the Reader unit below the battery compartment.

1. Reset	Resets the doseBadge
2. Cal	Calibrates the doseBadge
3. OK	Accepts changes & selects menu options
4. Arrow Keys	Select/Change/Data Entry
5. Menu	Displays the Reader Menu
6. Read	Reads data from the doseBadge to the Reader Unit
7. Stop	Stops the doseBadge
8. Run	Starts the doseBadge
9. Cancel	Cancel Changes/Exit from Menu
10. Power	Switches the Reader Unit On & Off



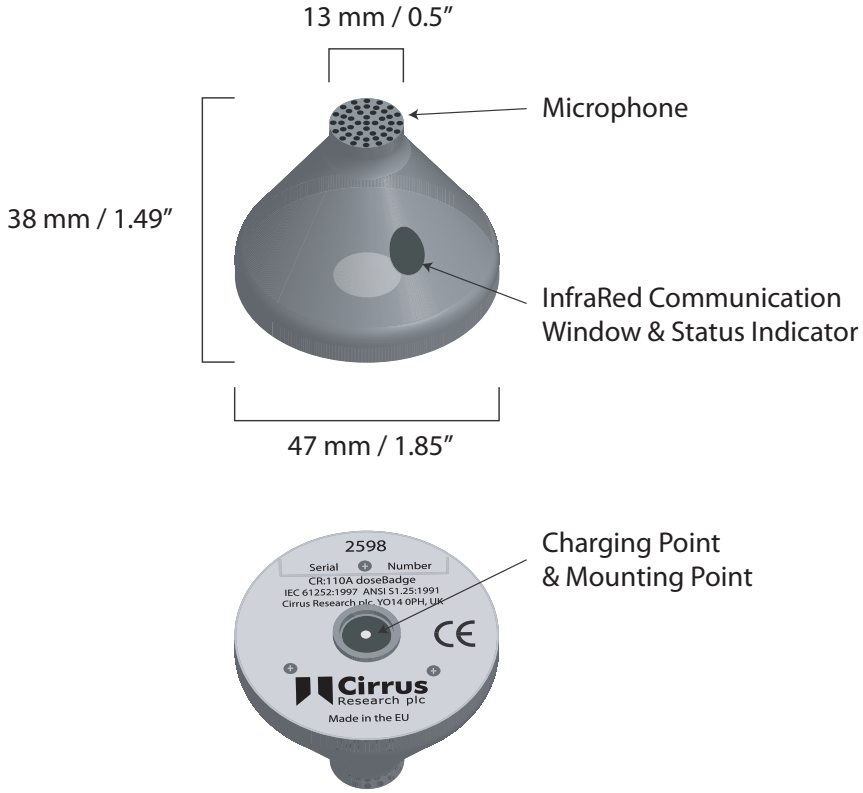
CR:110A dosebadge

The layout of the CR:110A doseBadge is shown on the right.

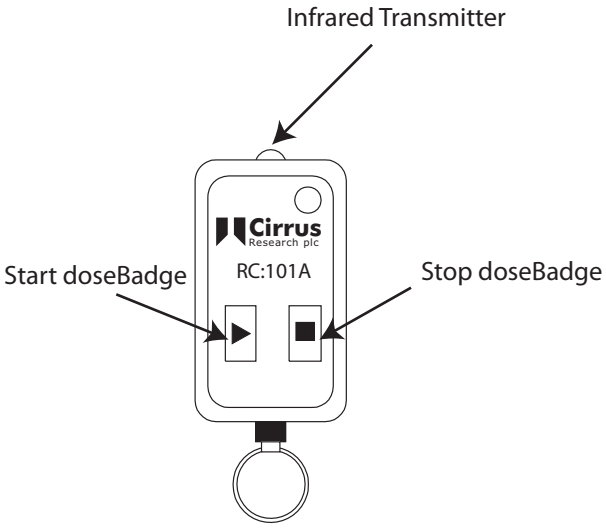
The microphone capsule is mounted in the top of the doseBadge in a shock mount to reduce the noise generated from movement or handling of the case.

The doseBadge is controlled via an InfraRed link to the Reader unit. Behind the InfraRed window are the transmitter and receiver for communication with the Reader.

The charging point for the doseBadge is on the bottom in the centre and this is also used for the mounting of the doseBadge.



RC:101A Keyfob Remote Control



The RC:101A Keyfob Remote control is designed to start and stop the doseBadge.

The Start and Stop buttons are used to send commands to the doseBadge. When the Start or Stop buttons are pressed, the Status indicator will light to show that the button has been pressed.

The InfraRed signal is sent from the transmitter on the front of the Keyfob. Ensure that this transmitter is kept clean.

If a button is pressed and the Status Indicator does not show, the battery may need to be replaced.

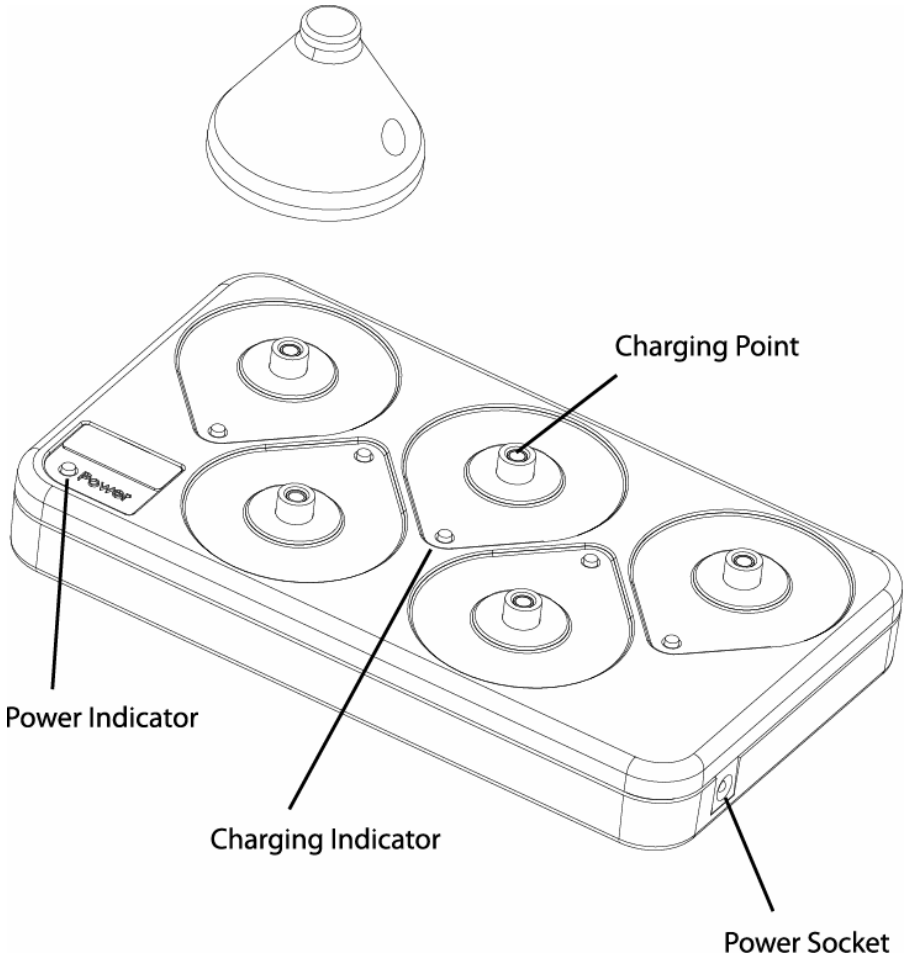
CU:110A Charger Unit

The CU:110A Charger Unit replaces all previous versions of the doseBadge chargers and is compatible with all versions of the doseBadge.

The charger has a number of new and important features which are different from the previous CU:100, CU:101 and CU:102 Chargers Units.

Important Features

- The maximum charge time is 2½ hours for a completely flat doseBadge. For a doseBadge that has a partially charged battery, the charge time will be much shorter
- The CU:110A Charger Unit always charges, ie there is no automatic discharge function
- The CU:110A is compatible with all previous versions of the doseBadge
- The CU:110A has a Discharge/Charge cycle button on the bottom of the unit to allow for the doseBadges to be fully discharged and recharged. This can be used where the doseBadges will not be used for more than 28 days (see page 48 for details)
- Charger Units can be “daisy chained” to allow 10 doseBadges to be charged



Section 3 Getting Started

Quick Start

There are different ways to use a doseBadge and Reader. The following simple instructions should be followed to carry out personal sound exposure measurements using a single CR:110A doseBadge and RC:110A Reader. Ensure that you have read all of the instructions and information contained in this manual before operating the equipment.

The basic operations are:

Function	see page:
• Ensure the doseBadge battery has been fully charged.	15
• Wake the doseBadge if it has not been used for 1 hour or longer	22
• Check configuration of doseBadge user the Reader menu	18
• Push the doseBadge into the calibration cavity on the Reader.	23
• Reset the doseBadge using the **Reset** key.	24
• Calibrate the doseBadge using the **Cal** key.	25
• Remove the doseBadge from the calibration cavity and attach it to the wearer.	26
• Start the session using the **Run** key or by using the Run key of the Keyfob unit.	28
• At the end of the shift, stop the session using the **Stop** key or use the Stop key of the Keyfob unit.	29
• Remove the doseBadge from the wearer and push into the calibration cavity on the Reader.	30
• Perform a second calibration check using the **Cal** key.	30
• Transfer the doseBadge session data to the Reader using the **Read** key.	31
• View the results	32
• Download measurements to the software	32

Unpacking the instrument for the first time

Carefully remove all of the components of the doseBadge system from the shipping container or carrying case and inspect it for possible damage or missing items. If there appears to be damage or something is missing, contact Cirrus Research plc or your local representative immediately.

Each CR:110A doseBadge is supplied with an SP:125 Mounting Kit which contains the following components:

- Round Mounting Plate
- Mounting Clip System

The RC:110A Reader Unit is supplied with the following accessories:

- USB Cable
- doseBadge Software CD
- Operating Manuals
- Certificates of Calibration

Please check that any other components that you have ordered are included with your equipment.

Charging the doseBadges

Please note that this manual refers to the CU:110A Charger Unit only. The information given does not apply to any previous version of the CU Charger Units. The CU:110A is identified by a Black Case with the older charger units having a White Case.

The CU:110A Charger Unit has a maximum charge time of 2½ hours. If the doseBadge is not fully discharged, the charge time will be shorter than this.

It is essential that this procedure is carefully followed otherwise damage will occur to the doseBadge battery.

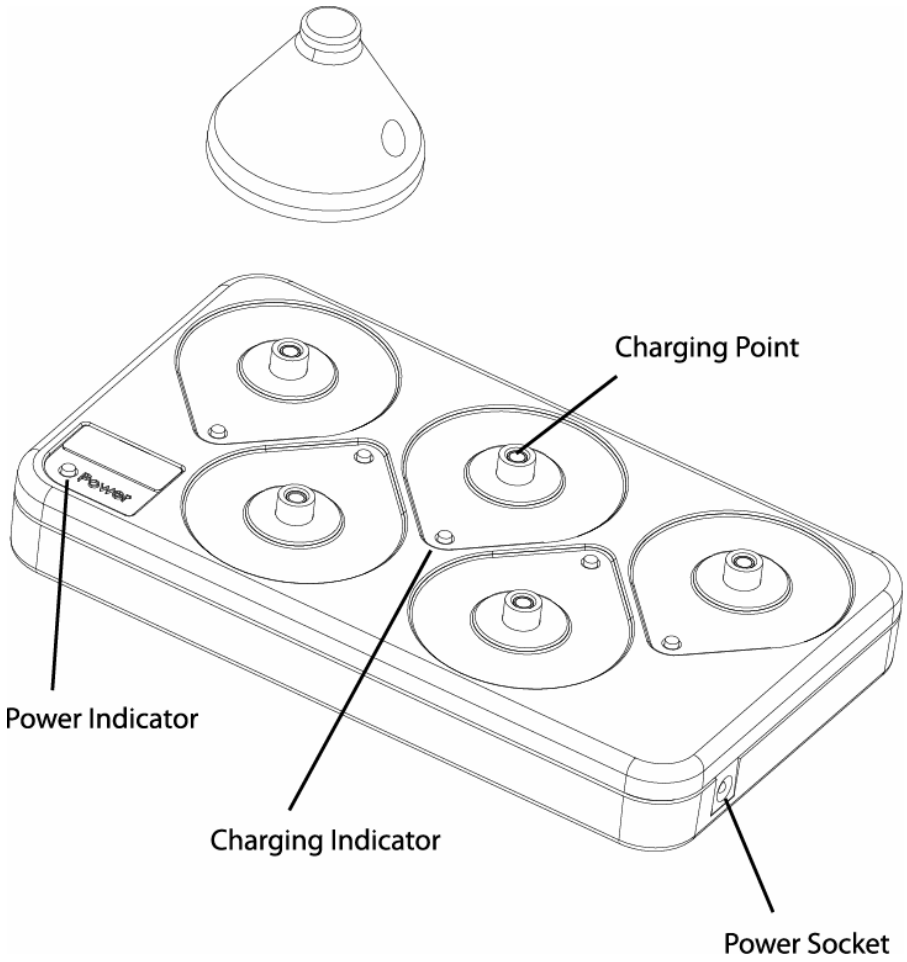
Before using the doseBadges for the first time, ensure that the units are allowed to charge fully. The doseBadges should be regularly recharged to maintain the performance of the battery pack (inside the doseBadge)

For further information regarding the charging and maintenance of the doseBadge, please refer to Page 47 “Maintenance & Care”

Connect the Charger to the mains power supply and switch on the power supply.

Ensure the doseBadge is in Stop Mode and carefully screw it onto the "charging stud" on a CU Series Charger unit.

Do not over tighten the doseBadge onto the Charger. The doseBadge should be screwed onto the charger until the indicator change status and then one more half turn.



During the charge cycle, the green indicator will flash to show that the charging is in progress.

Once charging has finished, the green indicator stops flashing and remains on continuously.

At this time the doseBadge is receiving a trickle charge to keep it topped up. To ensure optimum operation, the doseBadge may be left on trickle charge when not in use.

Summary of Charger Indicators

No Indicator	doseBadge Not Connected
Green LED Flashing	doseBadge Charging
Green LED On	doseBadge Charged

The CU:110A doseBadge Charger will display errors during charging if, for example, the doseBadge battery does not charge as expected. In this case, the Green LED will flash quickly to indicate the charging error.

Removing the power from the CU:110A Charger

If the power is removed from the CU:110A Charger Unit and then reconnected, the charging cycle will restart.

However, if the batteries in the doseBadges still contain charge when this occurs, the charging time will be shorter than the maximum 2½ hours charge time.

Inserting the RC:110A Reader Batteries

The RC:110A Reader unit requires batteries to operate. The doseBadge contains a rechargeable battery pack which is not user replaceable.

The batteries for the RC:110A Reader unit are located under the black cover on the back of the instrument.

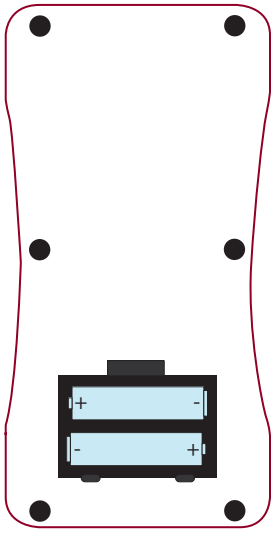
Before changing the main batteries, ensure that the Reader is switched off. The memory and clock of the Reader unit are protected when the main batteries are removed from the instrument.

The memory of the instrument is protected and the clock is kept for a maximum of 10 minutes.

Locate the battery compartment cover and remove it from the instrument. Remove the batteries from the Reader unit and replace with batteries of equivalent type and quality.

The battery should be of alkaline type AA (LR6 / AM3 / MN1500 / Mignon).

Ensure that the polarity of the batteries is correct. Replace the battery cover and switch the Reader unit on.

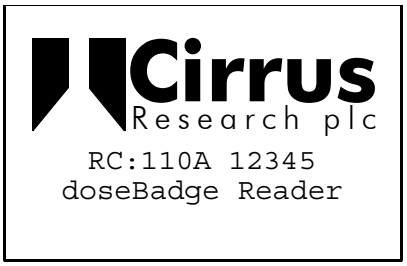


Remove the battery cover and replace the batteries.

Ensure the correct polarity when replacing the batteries

Switching on the Reader Unit

Press the Power button on the Reader to switch on. The Reader will power on and will display the start screen.



The Reader unit will automatically switch off after 4 minutes of inactivity.

The backlight of the display will switch on when any key pressed and will automatically switch off after 10 seconds to preserve battery power.

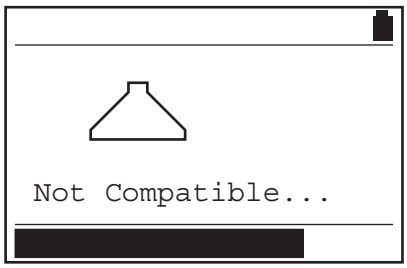
Checking the configuration

Before making a measurement with the doseBadge system, ensure that the configuration of the parameters listed below are as required to meet the regulations or guidelines for which the measurement are being made.

Cirrus Research plc accepts no responsibility for the accuracy of measurements made where the configuration of the doseBadge and Reader unit is not correct for Local, National or International Regulations.

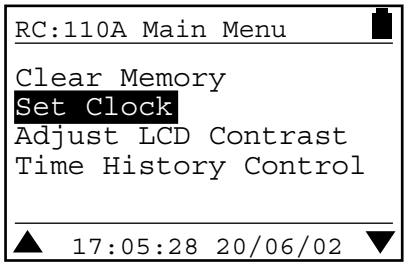
If you are in doubt about the correct settings for your system, please contact your local Cirrus Research representative or contact Cirrus Research plc directly.

Please note that the RC:110A Reader Unit will not allow a CR:100A or CR:100B doseBadge to be programmed with settings that are not compatible with these older instruments. If the user attempts to program a CR:100A or CR:100B doseBadge with an incorrect configuration, an error message will be displayed as shown below.



Clock (Time & Date)

The RC:110A Reader unit has a clock and calendar which is used to stamp the measurement with the current time and date. It is vital that the time and date of the clock in the Reader unit is correct.

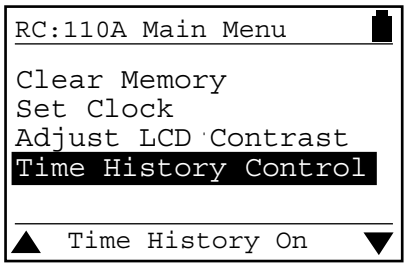


The current time and date is displayed at the bottom of the display. If the Clock has not been set, the Reader unit will show "Clock not set".

The current Time and Date are shown at the bottom of the display. If the Time and Date are not correct, press the OK button to enter the Clock Set menu.

The Time is set in the format hh:mm:ss and the Date is set in the format dd/mm/yy. For details of the procedure to set the clock, refer to section 4 A**Configuration & Options**@. This is the default configuration and can be changed in the dBLink3 software.

Time History Measurement



The Reader unit can be configured to download Time History data from the doseBadge at the end of the measurement.

The current setting for the Time History download is shown at the bottom of the screen. If the setting is not as required, the setting can be changed.

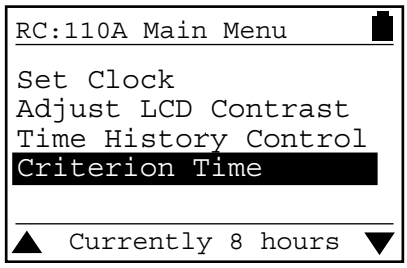
For details of the procedure to change the Time History storage function, refer to section 4 A**Configuration & Options**@.

Please note that the Time History data is stored as 1 Minute LAeq samples for 3dB Exchange Rates, and as 1 Minute Lavg samples for 4dB or 5dB samples.

Please note that this manual refers to the CR:110A doseBadge and RC:110A Reader Units that provide Dual Channel Measurement. The configuration options for the Criterion Time, Criterion Level, Threshold Level, Time Weighting and Exchange Rate detailed below apply to Channel 1. Channel 2 is preset with the following:

Criterion Time (CT)

From the menu, select the Criterion Time position. The current setting is displayed at the bottom of the screen.



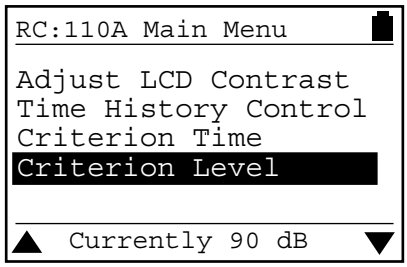
If the setting for the Criterion Time is not correct, the value can be selected from the list provided.

For further details of the procedure to change the Criterion Time, please refer to section 4, A**Configuration & Options**@.

The Criterion Time is programmed into the doseBadge when it is Reset by the Reader Reset key.

Criterion Level (CL)

From the menu, select the Criterion Level position. The current setting for the Criterion Level is shown at the bottom of the screen.

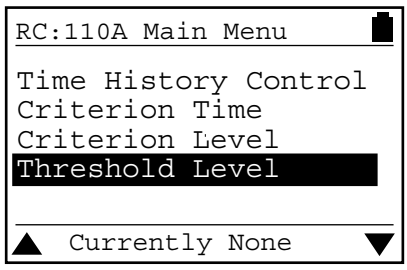


If the setting for the Criterion Level is not correct, the value can be selected from the list provided.

For further details of the procedure to change the Criterion Level, please refer to section 4, A**Configuration & Options**@.

The Criterion Level is programmed into the doseBadge when it is Reset by the Reader Reset key.

Threshold Setting (TH)



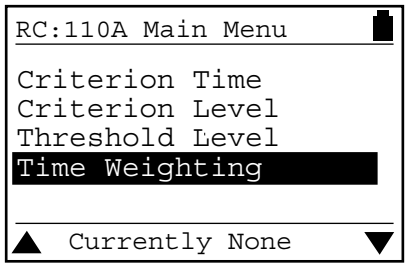
From the menu, select the Threshold Level position. The current setting for the Threshold Level is shown at the bottom of the screen. If the setting for the Threshold Level is not correct, the value can be selected from the list provided.

For further details of the procedure to change the Threshold Level, please refer to section 4, A**Configuration & Options**@.

The Threshold Level is programmed into the doseBadge when it is Reset by the Reader Reset key.

Time Weighting Setting (TW)

From the menu, select the Time Weighting position. The current setting for the Time Weighting is shown at the bottom of the screen.



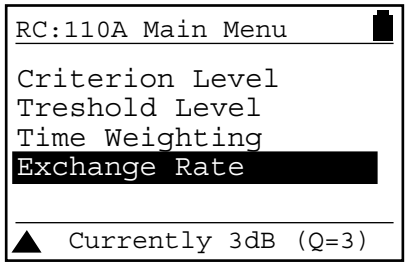
If the setting for the Time Weighting is not correct, the value can be selected from the list provided.

For further details of the procedure to change the Time Weighting, please refer to section 4, A**Configuration & Options**@.

The Time Weighting is programmed into the doseBadge when it is Reset by the Reader Reset key.

Exchange Rate Setting (Q)

From the menu, select the Exchange Rate position. The current setting for the Time Weighting is shown at the bottom of the screen.



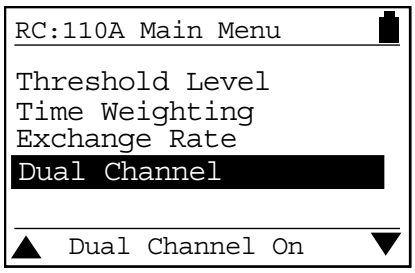
If the setting for the Exchange Rate is not correct, the value can be selected from the list provided.

For further details of the procedure to change the Exchange Rate, please refer to section 4, A**Configuration & Options**@.

The Exchange Rate is programmed into the doseBadge when it is Reset by the Reader Reset key.

Dual Channel

The Dual Channel menu option allows the simultaneous measurement of Channel 1 and Channel 2 to be made.

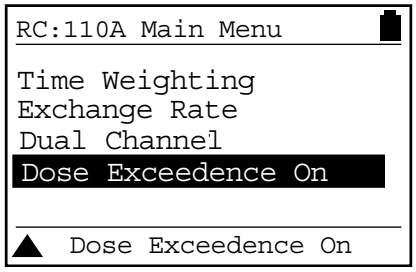


The options are to switch the Dual Channel Measurement On and Off.

It is recommended that this option is left switched ON.

Dose Exceedence

The CR:110A doseBadge can indicate when the 100% Noise Dose value has been exceeded during the measurement.



When this option is switched on, the LED indicator on the doseBadge will flash twice every second to indicate that the noise exposure has exceeded the 100% Dose value.

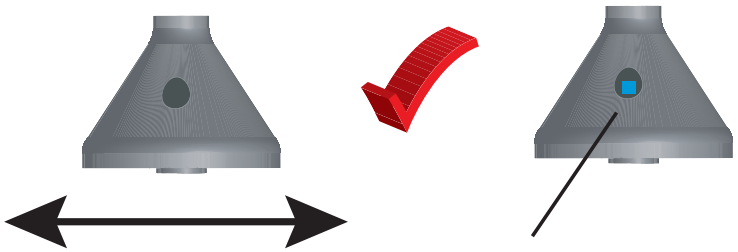
As the % Dose value is a cumulative value, once the indicator has started to flash more quickly it will continue to do so for the remaining measurement duration.

"Shake to Wake" function

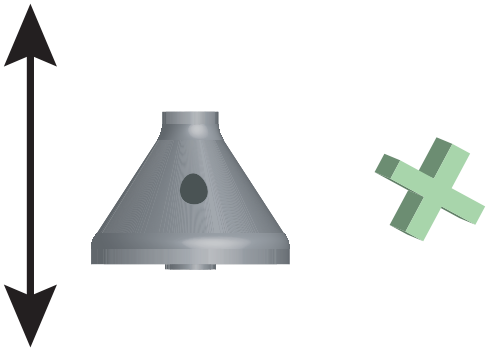
A new feature added to the CR:110A doseBadge is the "Shake to Wake" function. Please read the information below carefully before using the doseBadge.

In the CR:110A doseBadge, a function has been added to lengthen the battery life of the unit. If the doseBadge has not been used for 1 hour and it is not measuring data, it will go into Sleep mode. This reduces the amount of power required to run the doseBadge and a fully charged unit will remain charged and ready for use for up to 28 days.

Shake the dosBadge in this direction to activate the sensor and wake the instrument



The status indicator will flash when the doseBadge wakes.



The doseBadge may notwake if shaken in this direction

If the doseBadge is in Sleep mode, it will not communicate with the Reader Unit until it has been woken by physically shaking the doseBadge.

To check if the doseBadge is in Sleep mode point the Reader Unit at the doseBadge and press the Stop button. If the status indicator flashes (blue), the doseBadge is awake and can be used.

If the doseBadge does not respond, it is in Sleep mode and must be woken before use. The CR:110A doseBadge has an internal sensor that must be activated to wake the doseBadge from Sleep mode.

To wake the doseBadge, shake the unit as shown in the diagram below. When the sensor is activated, the doseBadge status indicator will flash (blue) twice and the doseBadge can be used.

Note that the sensor may be activated when the doseBadge is removed from the charger unit or when it is handled. If the indicator light does not flash when the doseBadge is shaken, check that the doseBadge is not already awake by pointing the Reader Unit at the doseBadge and pressing the Stop button.

If the indicator shows, the doseBadge is awake and ready to use.

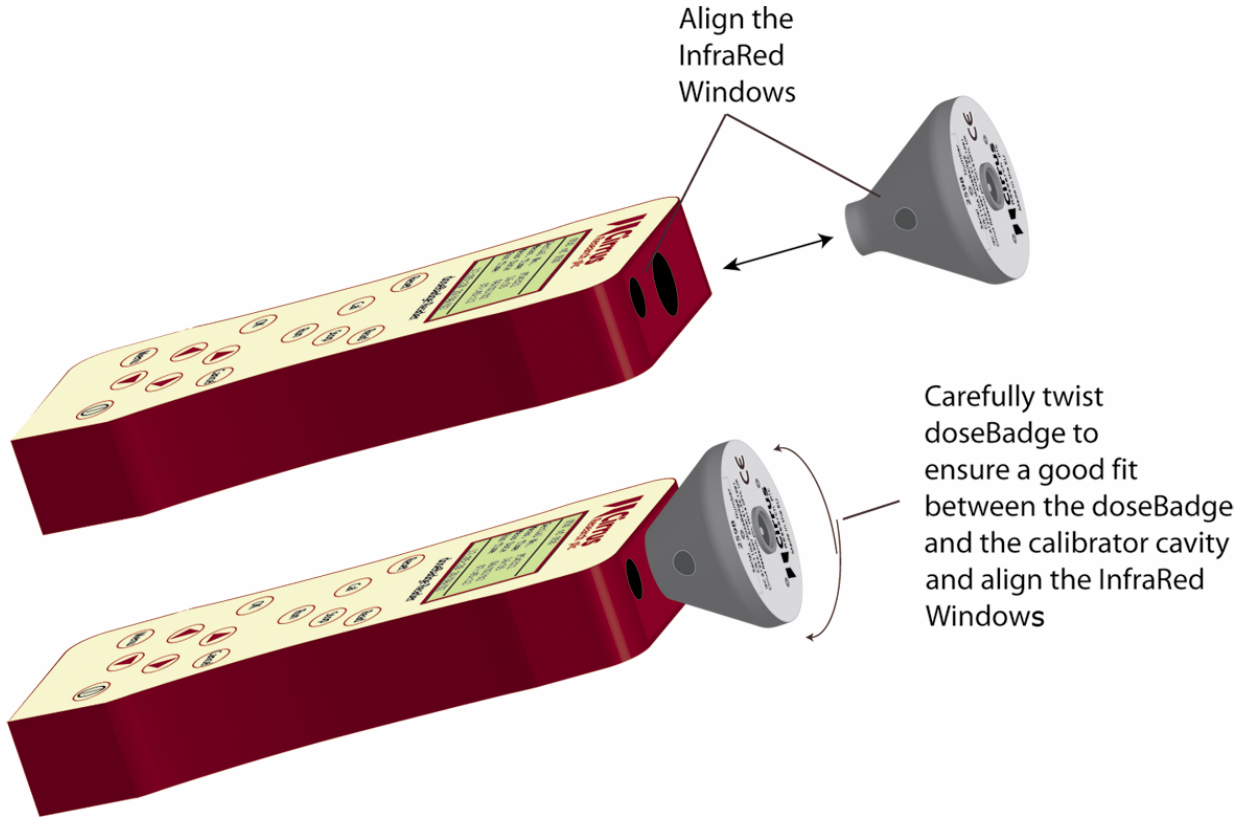
Please note that if the doseBadge is running, it will ***not*** go into Sleep mode. The doseBadge will only enter Sleep mode if it has been ***stopped*** for more than 1 hour and does not receive commands from the Reader unit.

Please note that if the internal battery in the doseBadge is not charged, it will not be possible to wake the doseBadge from Sleep mode. Ensure that the doseBadge is fully charged before attempting to use the unit.

Insert the doseBadge in the Acoustic Calibrator

Before the doseBadge can be reset or calibrated, it must be inserted into the Acoustic Calibrator cavity to allow communication between the doseBadge and the Reader unit.

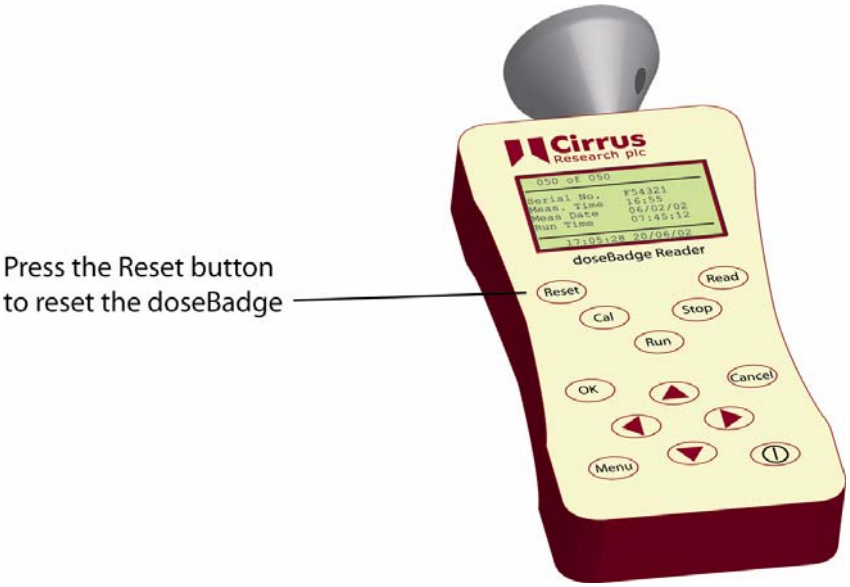
The figures here show the alignment of the doseBadge in the Reader cavity. Ensure that the InfraRed window of the doseBadge is aligned with the InfraRed Port of the Reader unit.

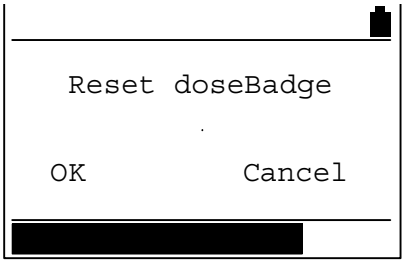


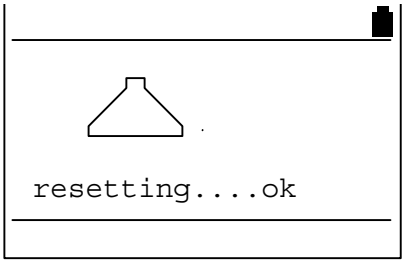
The doseBadge must be pushed firmly into the calibrator cavity to make sure that there is a good quality seal around the microphone. If the doseBadge is not pushed into the calibrator cavity, the acoustic calibration level will be reduced and the calibration will fail.

Resetting the doseBadge

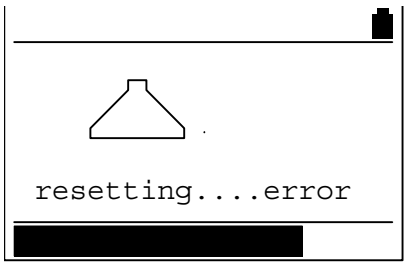
The doseBadge must be reset before a measurement is made. Resetting the doseBadge will clear any information from the doseBadge, program the doseBadge with the user configuration, set the date and time and prepare the unit for calibration.







The Reader will communicate with the doseBadge and when the Reset is complete, the indicator on the doseBadge will flash twice. If there is an error, the Reader will indicate the problem.

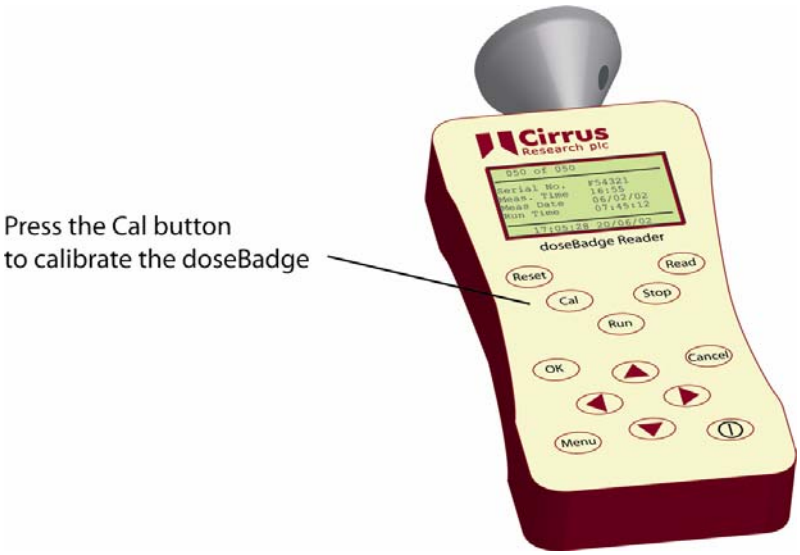


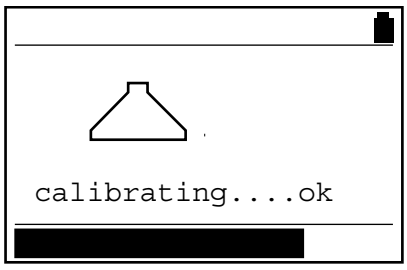
When the doseBadge is Reset, the configuration of the doseBadge as described above is programmed into the instrument by the Reader.

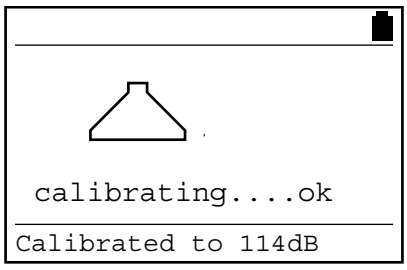
Press the OK or Cancel button to return to the main screen.

Calibrating the doseBadge

The doseBadge must be calibrated before operation to ensure that the measurements are correct. To calibrate the doseBadge, press the **Cal** key.







When the calibration is complete, the Reader unit will display the calibration information.

If the calibration of the doseBadge cannot be completed sucessfully, the Reader will display an error message. See Section 7 "Troubleshooting" for more details.

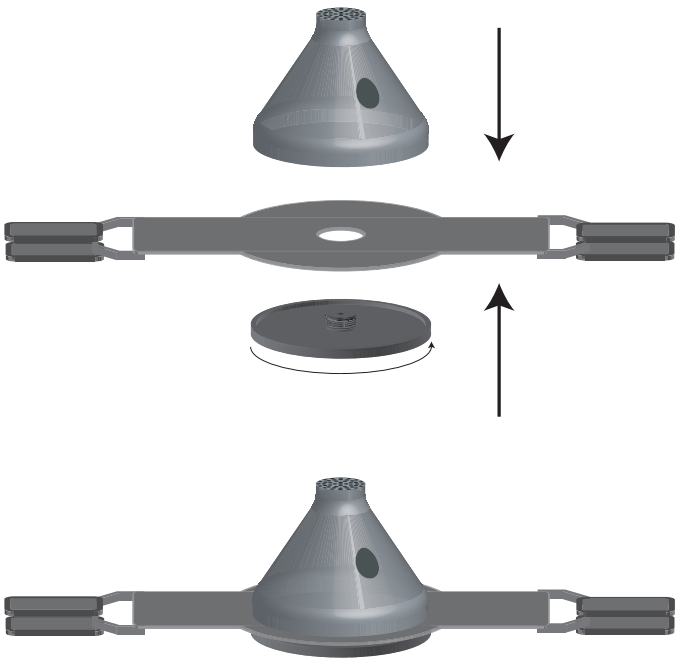
The Reader will display the calibration information until a key is pressed.

Mounting the doseBadge

The doseBadge is supplied, as standard, with accessories to mount the doseBadge on the shoulder of the wearer. There may be applications where the doseBadge must be mounted in an alternative location, such as on a hard hat or other clothing or safety equipment.

The doseBadge should be mounted to the wearer on the shoulder as shown above. Ensure that the doseBadge will not generate noise itself when the wearer moves.

The doseBadge window should be at the front to ease the starting and stopping of sessions using the infrared link with the Reader.

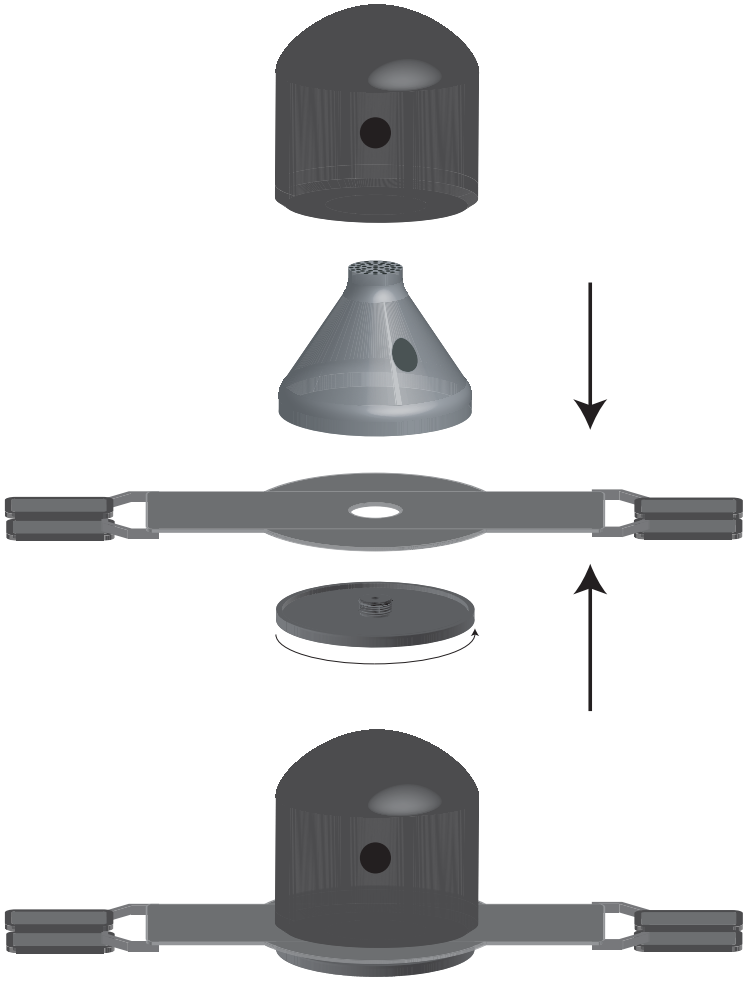


Using the doseBadge Windshield

The optional UA:100 doseBadge Windshield can be used to reduce the effects of air movement upon the noise measurements. The windshield also reduces the effects of impacts upon the noise measurements which may cause false Peak(C) readings.

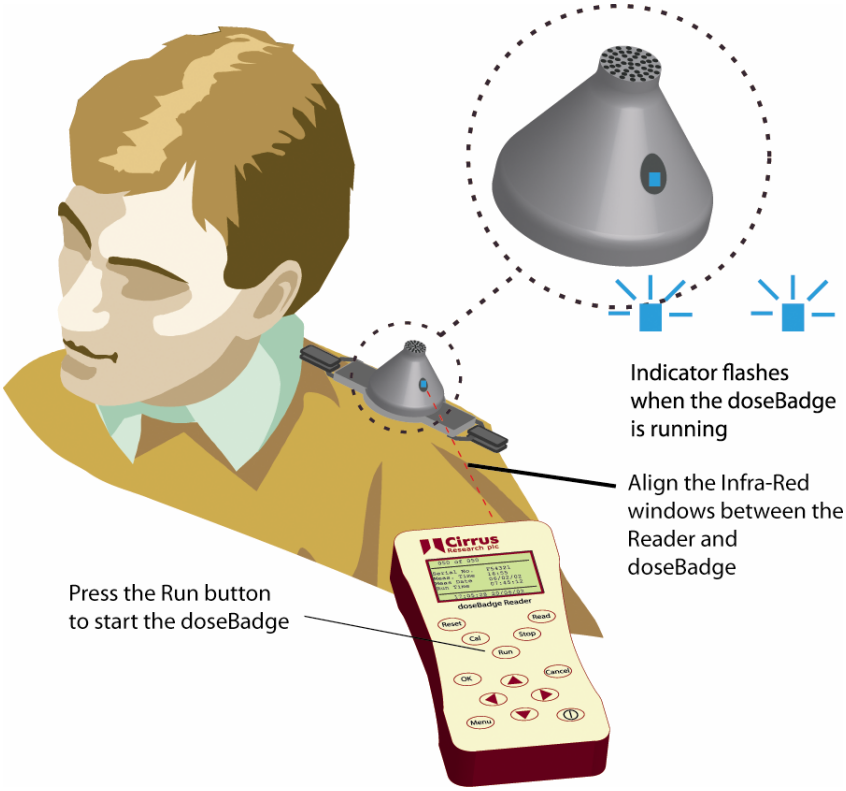
The windshield is secured between the doseBadge case and the mounting plate or patch. Ensure that the hole in the windshield is aligned with the infrared window of the doseBadge.

The UA:100 doseBadge windshield can also prevent dust ingress into the microphone capsule.

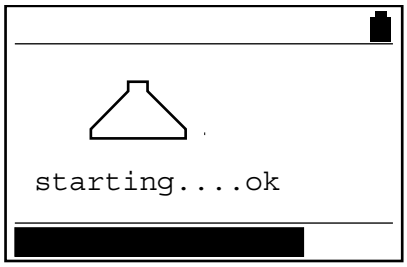


Starting the measurement

To start a measurement session, hold the Reader with the infrared link aimed at the infrared link window of the doseBadge. The Reader and doseBadge can be up to 50cm apart. Press the **Run** key. The Reader will program the start time and date into the doseBadge.



The Reader will show the status of the communication between the doseBadge and the Reader on the display.



Do not move the Reader away from the doseBadge until the indicators show in the doseBadge.

An indicator will show in the badge window for up to 2 seconds to show that it has received the message and started running. If an indicator does not show then try again.

When the doseBadge is running (and making a measurement), the indicator will flash quickly to indicate that the unit is operating.

The doseBadge can now be left on the wearer. The wearer should be instructed to avoid knocking the badge as this can affect the Peak measurements and add to the noise dose.

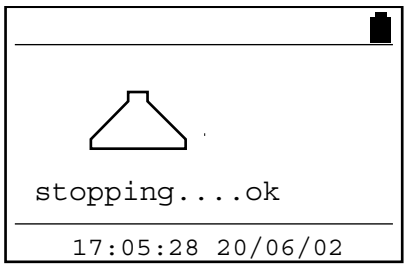
Using the RC:101A Keyfob Remote Control

The doseBadge can also be started using the RC:101B Keyfob Remote Control. Point the Keyfob at the doseBadge infrared window and press the Run button. The doseBadge will start in the same way as described above for the Reader unit.

Stopping a measurement

At the end of a measurement period, hold the Reader up to the doseBadge as shown above and press the **Stop** key.

The Reader will show the status of the communication between the doseBadge and the Reader on the display.

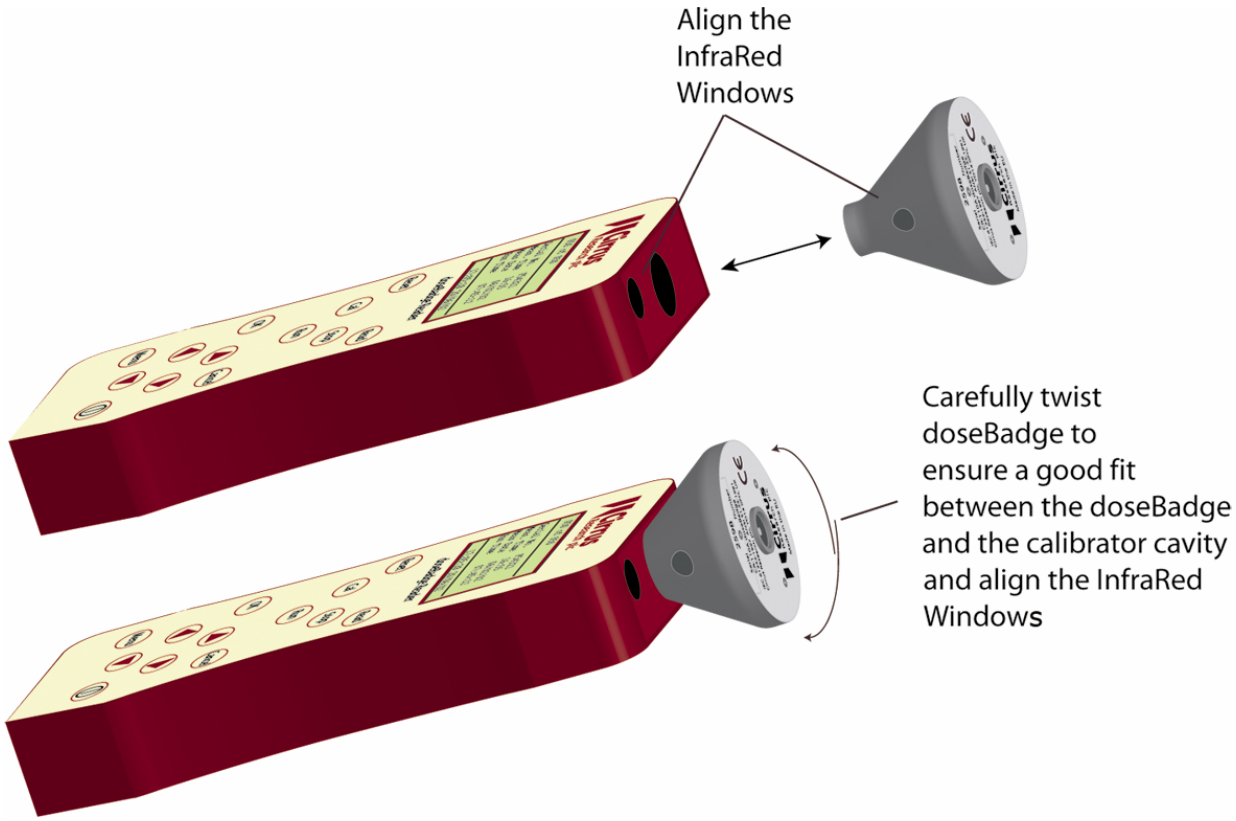


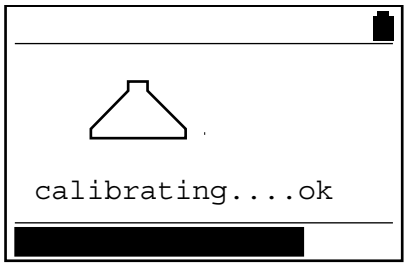
An indicator will flash through the doseBadge window to indicate the change from Run to Stop. Handling the doseBadge will now have no affect on the measurements and so the doseBadge can now be removed from the wearer.

The doseBadge can also be stopped using the RC:101A Keyfob Remote Control.

Checking the Calibration of the doseBadge

The calibration of the doseBadge can be checked by removing the unit from the wearer and performing the same calibration procedure as described above. This records the second calibration value into the doseBadge. Insert the doseBadge into the Acoustic Calibrator on the Reader unit, ensuring that the InfraRed Port on the Reader is aligned with the InfraRed window on the doseBadge.





Press the **Cal** button to perform the second calibration.

The Reader will show the status of the communication between the doseBadge and the Reader on the display.The second calibration does not affect the measurement information and is used for information only.

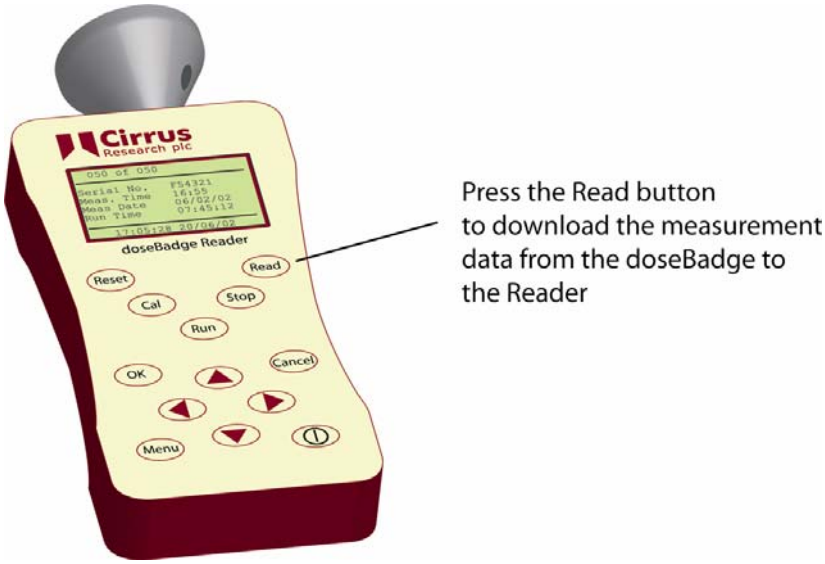
The Reader will display the calibration information until a key is pressed.

Downloading the measurements to the Reader Unit

The doseBadge must be in the Acoustic Calibrator cavity on the Reader before the measurements are downloaded.

If the Time History Measurement configuration has been set to Off, no Time History data will be downloaded from the doseBadge. Ensure that the Time History configuration is set to the required setting before reading measurement data from the doseBadge.

To download the measurement information from the doseBadge to the Reader, press the **Read** key. The Reader will display the status of the communication during the download period.



The Reader unit downloads the measurement parameters before downloading the Time History. If there are errors during the download of the Time History data, the Reader will store the measurement parameters and show the message "Trace Error" at the bottom of the display.

The measurement data is downloaded automatically from the doseBadge and is then displayed on the screen of the Reader Unit.

Viewing stored measurements

When the measurement download has been completed, the Reader unit will display the last measurement data.

The different measurement parameters can be viewed by pressing the Down Arrow button. For further details, please refer to section 5 A**Reviewing & Downloading Measurements**@.

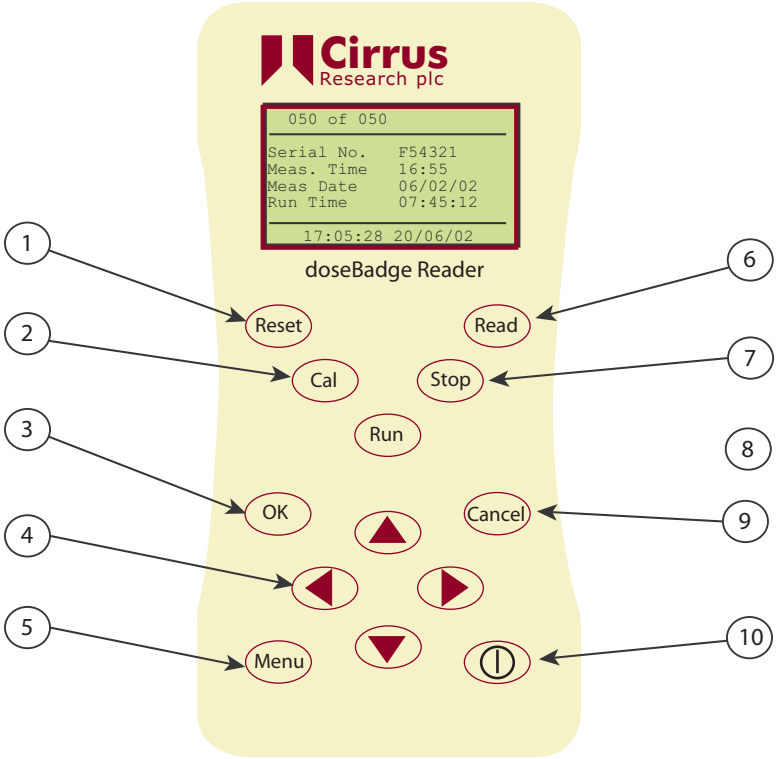
Downloading stored measurements to the doseBadge software

Measurements can be downloaded from the Reader unit to the doseBadge software supplied with the RC:110A Reader Unit. If the dBLink3 and dBase Database programs have been installed, connect the Reader unit using the supplied USB cable to the PC. The dBLink3 software will automatically connect to the Reader and the measurement information can be downloaded.

Please refer to the help provided with the dBLink and the dBase Database for details of the download procedure. Refer to section 5 A**Reviewing & Downloading Measurements**@ for details of connecting the Reader to a PC.

Section 4 Configuration & Options

RC:110A Reader Keypad

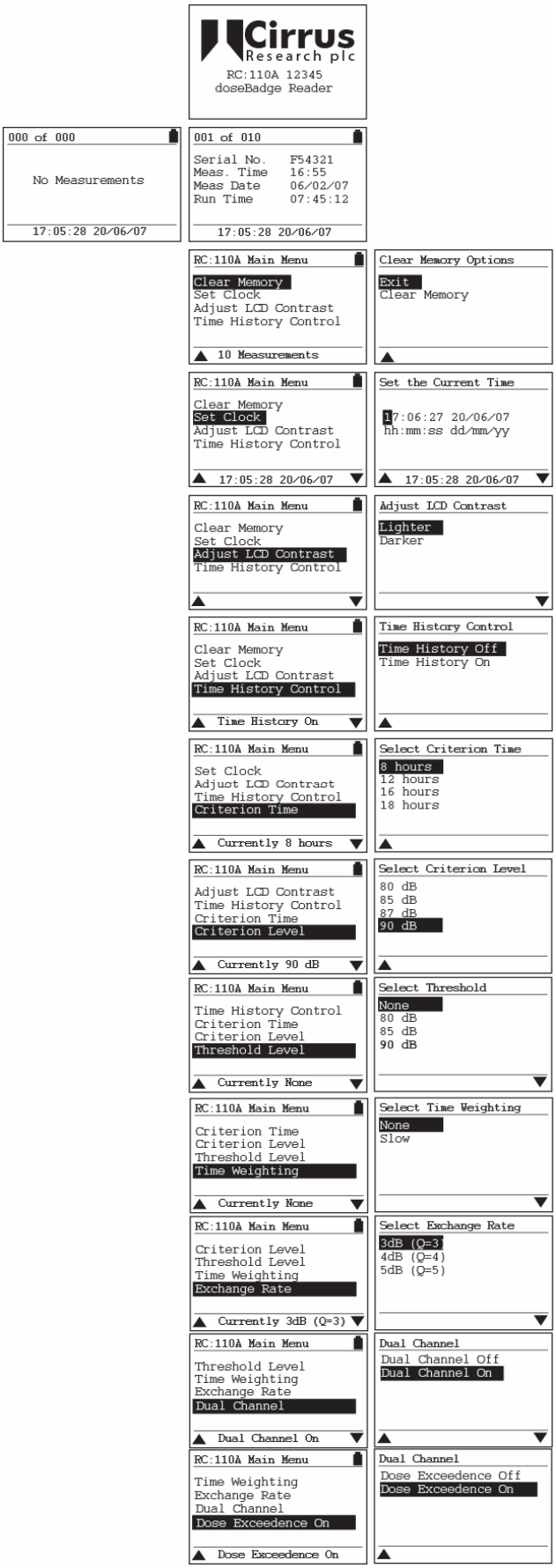


The keypad of the RC:110A Reader unit has the following keys as shown in the figure above:

(1) Reset	Resets the doseBadge. All information in the doseBadge is deleted and the configuration data programmed.
(2) Cal	Calibrates the doseBadge using the internal Acoustic Calibrator. This key is also used for the second calibration check if required.
(3) OK	Accepts data entry or confirms menu options.
(4) Arrow Keys	Allows the user to move around the menus and information shown on the display.
(5) Menu	Displays the menu options.
(6) Read	Downloads the measurement information from the doseBadge to the Reader.
(7) Stop	Stops the doseBadge measurement
(8) Run	Starts the doseBadge measurement
(9) Cancel	Exits from the menu options.
(10) Power	Switches the Reader on and off. The Reader will automatically switch off after 2 minutes of inactivity.

Menu Structure

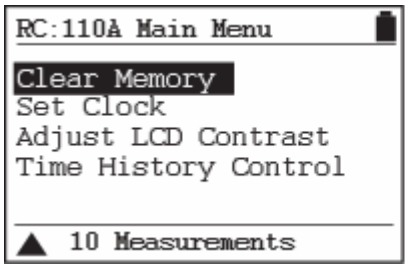
The menu system of the RC:110A Reader unit is entered by pressing the Menu key. The menu system can be exited by pressing the Cancel key at any time. The layout of the menu system is shown below:

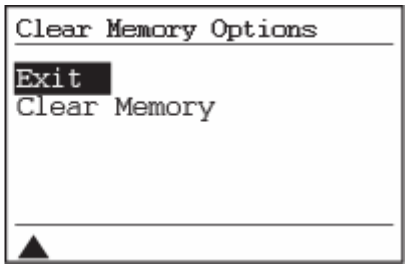


Clear the memory of the Reader

The RC:110A Reader has a memory of 192kB which allows a large number of measurements to be stored. Please refer to the Specification for full details of the memory available.

The memory of the RC:110A Reader unit can be cleared when required. Please ensure that all measurements have been downloaded to the doseBadge Database before clearing the memory.

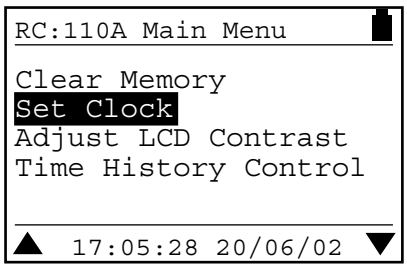


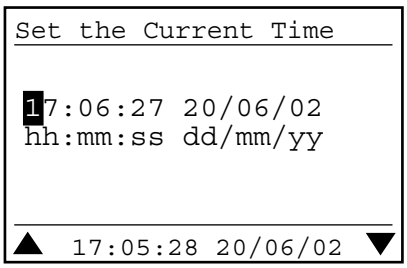


To clear the memory, access the menu by pressing the Menu button and select the Clear Memory option.

Set Clock

The RC:110A Reader unit has a clock and calendar which is used to stamp the measurement with the current time and date. It is vital that the time and date of the clock in the Reader unit is correct. To check the current time and date, press the menu button to enter the menu options. If the Reader time and time is not set then the display shows “Please set clock”



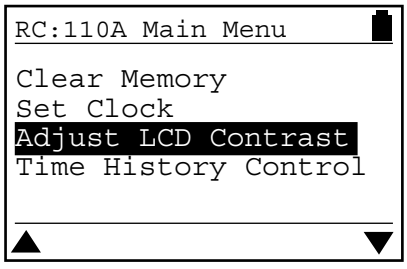


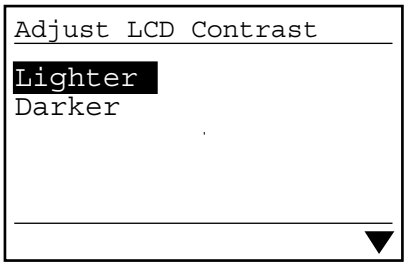
The current Time and Date are shown at the bottom of the display.

If the Time and Date are not correct, press the OK button to enter the Clock Set menu.

The default time format in the Reader Unit is hh:mm:ss and the default date format dd/mm/yy. However, the dBLink3 software allows the user to change these to suit the country where the doseBadge will be used. Please refer to the dBLink3 software for further details.

Adjust Display Contrast



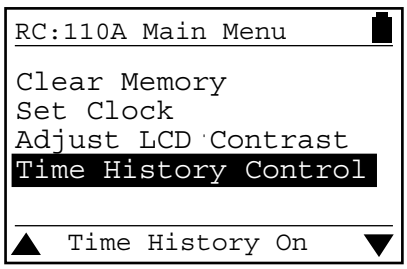


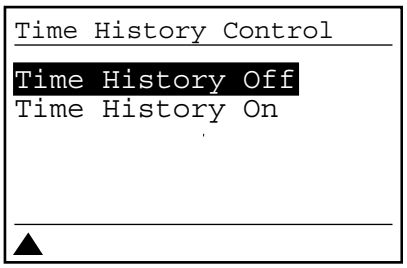
The contrast of the LCD display can be adjusted to accommodate different ambient light conditions. To change the contrast of the LCD display, press the OK key on

either the Lighter or Darker options.

Time History Measurement Mode

The doseBadge system can be configured to download Time History data from the doseBadge at the end of the measurement. The Time History data download can be selected to be either On or Off as required.





Please note that selecting the On option will increase the download time over the No Time History option.

The current setting for the Time History download is shown at the bottom of the screen. If the setting is not as required, the setting can be changed.

In the Dual Channel version of the CR:110A doseBadge, the Time History data for Channel 2 is always stored as a 1 minute LAeq samples.

For Channel 1, when the Exchange rate is set to 3dB, the Time History data is stored as 1 Minute LAeq samples. When the exchange rate is set to 4dB or 5dB, the Time History data is stored as 1 Minute L_{AVG} samples.

In addition, the 1 Minute Peak(C) level and 1 Minute doseBadge Battery level are also stored and downloaded and stored as a Time History.. These two parameters are not displayed on the Reader unit and are only available via the dBLink3 software.

The data stored can be viewed in the dBLink3 software and the doseBadge Database programs. Please refer to these software programs for details of the data storage type.

Also refer to the Troubleshooting guide on page 51 for further information.

Configuration of the Measurement Parameters

The CR:110A doseBadge, when used with the RC:110A Reader Unit, allows configuration of several different measurement parameters which can be adjusted to meet the requirements of Local, National or International Standards as required.

The version of the doseBadge referred to in this manual provides Dual Channel measurements. Channel 2 is preset to a 3dB ISO configuration and cannot be altered by the user.

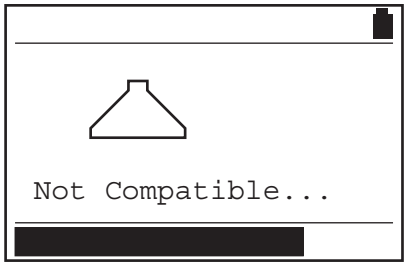
The following parameters can be configured for Channel 1 as required.

- Criterion Time
- Criterion Level
- Threshold Level
- Time Weighting
- Exchange Rate

Please note that any changes of the doseBadge configuration will only be programmed into the doseBadge when it is Reset by the Reader unit.

The Glossary on page 54 provide additional information about these different parameters.

Please note that the RC:110A Reader Unit will not allow a CR:100A or CR:100B doseBadge to be programmed with settings that are not compatible with these older instruments. If the user attempts to program a CR:100A or CR:100B doseBadge with an incorrect configuration, an error message will be displayed as shown below.

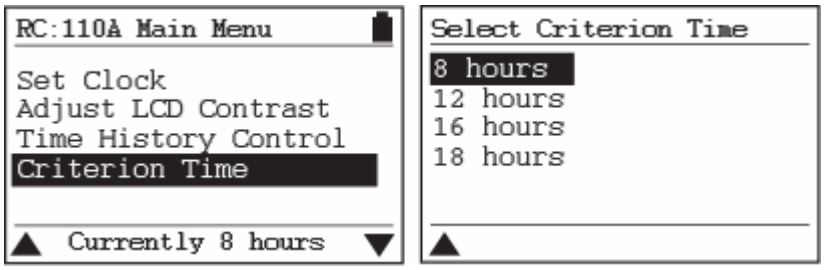


Criterion Time (CT)

The Criterion Level, displayed as CT by the Reader unit, is used by the doseBadge system for the calculation of the following measurement functions:

$L_{EP,d}$ or TWA
% Noise Dose
Estimated % Noise Dose

To check the setting for the Criterion Time (CT), press the menu button and select the Criterion Time option. The current setting for the Criterion Time is shown at the bottom of the screen.



By default, the Criterion Time is set to 8 hours. The Criterion Time can be selected from the following durations:

8 hours
12 hours
16 hours
18 hours

If the setting for the Criterion Time is not correct, the value can be selected from the list by pressing the OK button and selecting the required value.

Criterion Level (CL)

The Criterion Level, displayed as CL by the Reader unit, is used by the doseBadge system for the calculation of the following measurement functions:

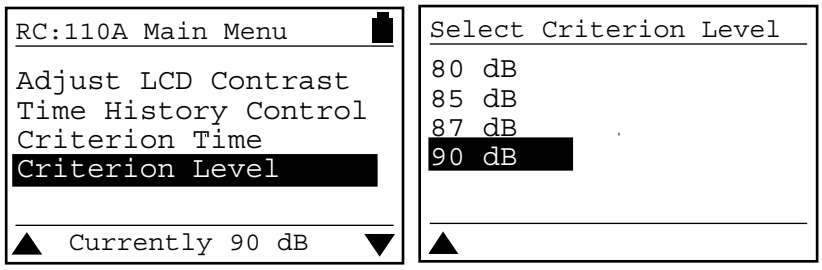
% Noise Dose
Estimated % Noise Dose

To check the setting for the Criterion Level (CL), press the following buttons. The current setting for the Criterion Level is shown at the bottom of the screen.

The Criterion Level can be selected from the following levels:

80dB
85dB
90dB
95dB

If the setting for the Criterion Level is not correct, the value can be selected from the list.



Threshold Level

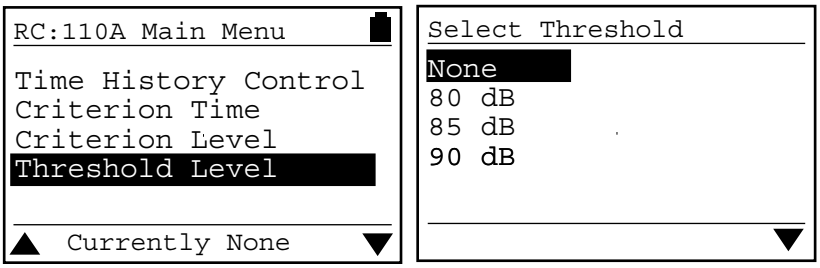
The Threshold Level, displayed as TH by the Reader Unit, is used in the calculation of all of the noise parameters. If the Threshold is set, all noise levels below this value are effectively ignored in the measurement data.

To check the setting for the Threshold Level (TH), press the menu button and select the Threshold Level option. The current setting for the Threshold Level is shown at the bottom of the screen.

The Criterion Level can be selected from the following levels:

None
80dB
85dB
90dB

Please note that for many applications, the Threshold Level should be set to None. This applies in the European Union and in many other countries that use the 3dB Exchange Rate.



Ensure that this parameter is set to meet the requirements of any regulations that are to be met.

Measurements made with an incorrect Threshold Level ***cannot*** be recalculated after the measurement has been made.

Time Weighting

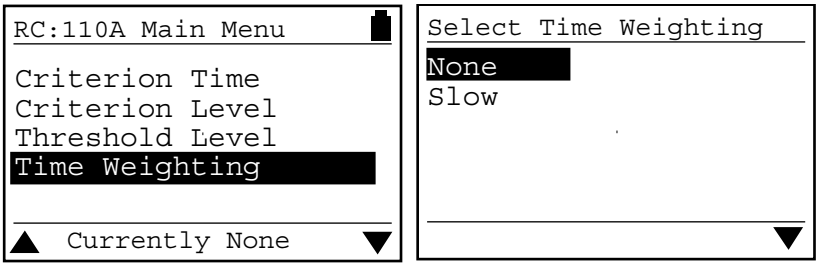
The Time Weighting, displayed as TW by the Reader Unit, is used in the calculation of all of the noise parameters. If the Time Weighting is set, all noise levels are weighted before being used in the calculations.

To check the setting for the Time Weighting (TW), press the menu button and select the Time Weighting option. The current setting for the Time Weighting is shown at the bottom of the screen.

The Time Weighting can be selected from the following levels:

None
Slow

Please note that for many applications, the Time Weighting should be set to None. This applies in the European Union and in many other countries that use the 3dB Exchange Rate.



Ensure that this parameter is set to meet the requirements of any regulations that are to be met.

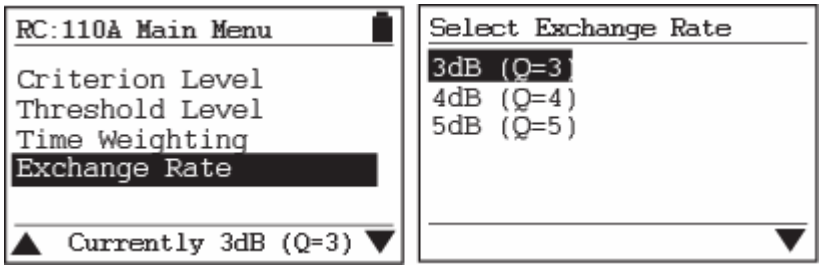
Measurements made with an incorrect Time Weighting ***cannot*** be recalculated after the measurement has been made.

Exchange Rate

The exchange rate is used in the calculation of all of the noise parameters.

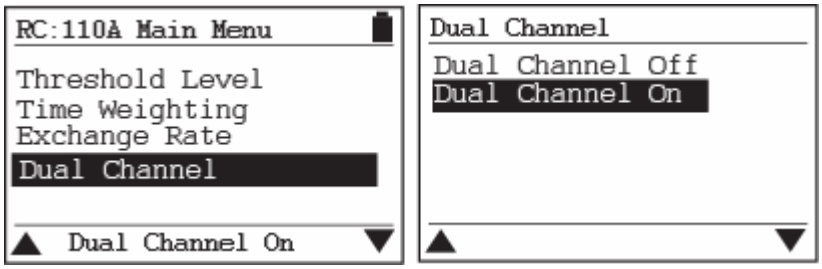
To check the setting for the Exchange Rate (Q), press the menu button and select the Exchange Rate option. The current setting for the Exchange Rate (Q) is shown at the bottom of the screen.

Ensure that this parameter is set to meet the requirements of any regulations that are to be met. Measurements made with an incorrect Exchange Rate ***cannot*** be recalculated after the measurement has been made.



Dual Channel Measurement

The CR:110A doseBadge provides Dual Channel measurements. This can be switched On or Off

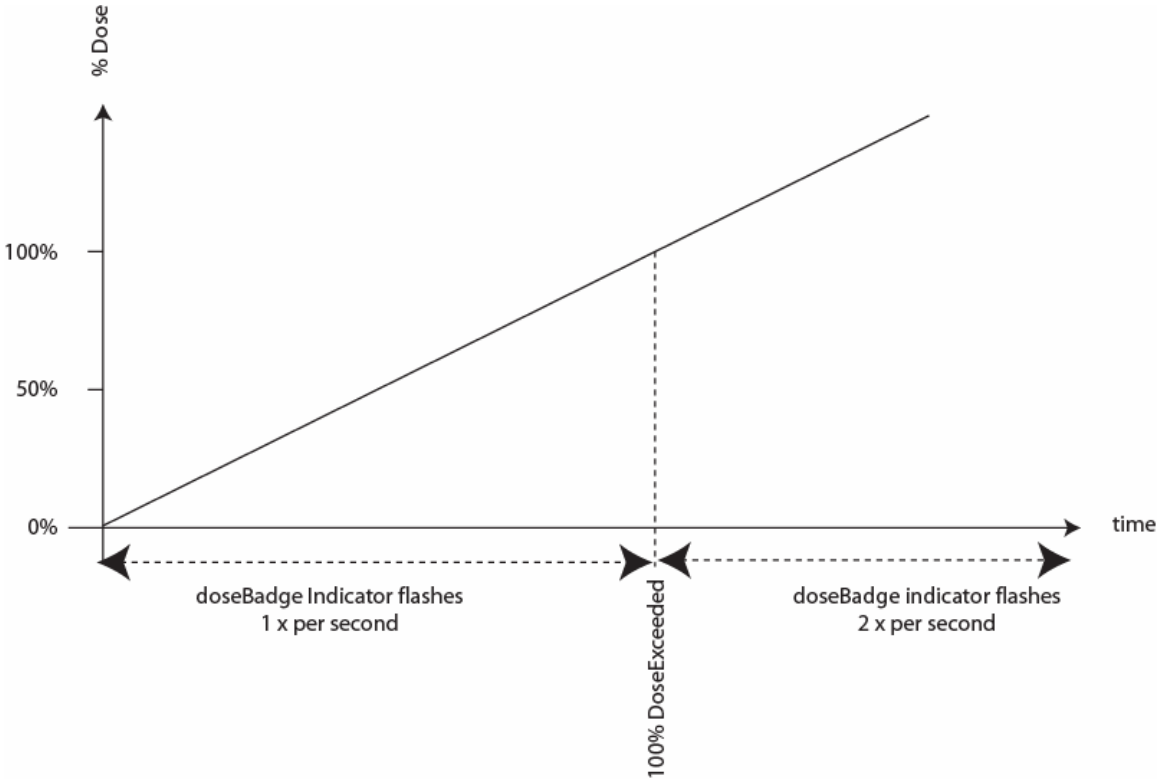


It is recommended that the Dual Channel measurement function is left switched on.

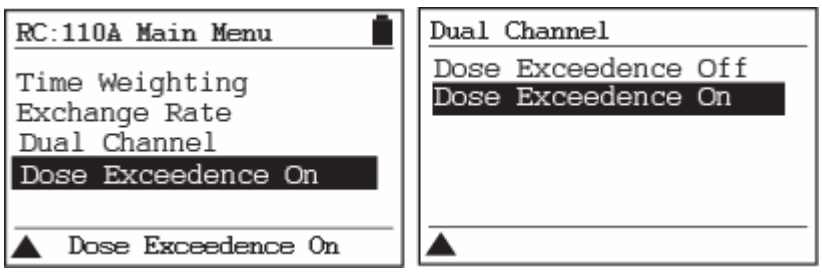
% Dose Exceedence

The version of the CR:110A doseBadge referred to in this manual provides a visual display of when the accumulated noise has exceeded the % Dose level.

For example, if the Criterion Level is set to 90dB, the 100% Noise Dose is equivalent to a level of 90dB over 8 hours. If this % Dose level is exceeded during the measurement the doseBadge indicator will flash twice per second.



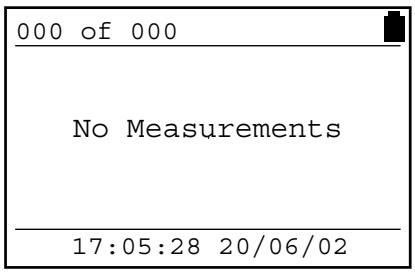
This function can be switched On or Off as required.



Section 5 Reviewing & Downloading Measurements

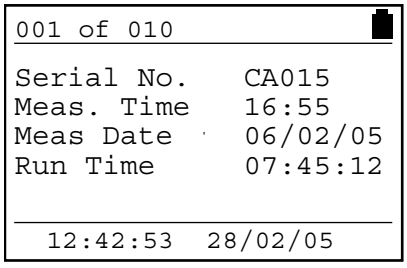
Once measurements have been downloaded from the doseBadge into the Reader unit, they are stored in the memory of the Reader automatically. The measurements can be reviewed on the display of the Reader unit or they can be downloaded from the Reader to the dBLink and the doseBadge Database software.

Reviewing stored measurements



Press the Cancel button to exit any menus and return to the Measurement Display Mode. If there are no measurements stored in the Reader unit, the following information will be displayed:

Where measurements are stored, the Reader will show the last measurement to be downloaded as follows:



This display shows that there are 10 measurement stored in the memory of the Reader and that the measurement shown is number 1 of 10.

The arrow keys allow the measurement information to be viewed and the different measurements to be accessed as follows:

The information stored for each measurement will be determined by the configuration of the doseBadge.

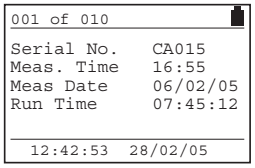
Please note that the information provided by the 3dB configuration will include L_{Aeq} and $L_{EX,8}$ data only if the Threshold Level is None ***and*** if the Time Weighting is None. If either of these parameters are set to other values, the measurement data will be displayed as L_{AVG} and TWA.

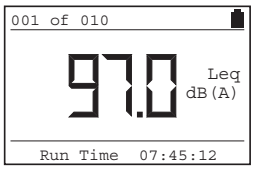
L_{Aeq} and $L_{EX,8}$ data cannot be calculated where a Threshold or a Time Weighting are used. Ensure that the doseBadge is correctly configured before making measurements. Measurement data cannot be recalculated after the measurement has been made.

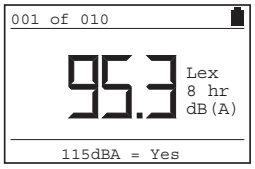
An example of the measurement data parameters provided are shown on the next page.

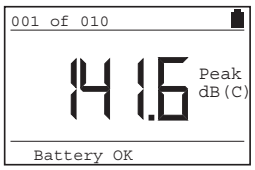
Please note that the dBLink3 software allows the user to select which additional measurement functions are displayed on the Reader display. When these additional parameters are downloaded, they are automatically stored in the Reader unit but are not displayed on the screen.

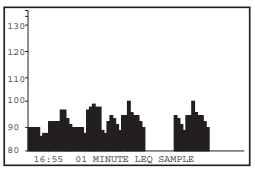
LAeq & LEX,8 Measurement Data

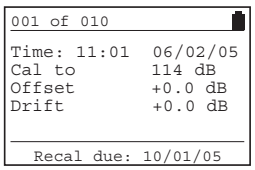


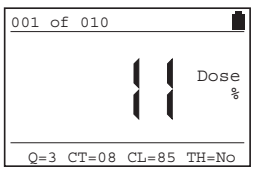


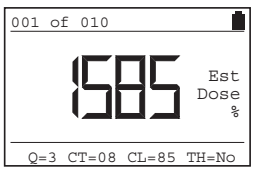


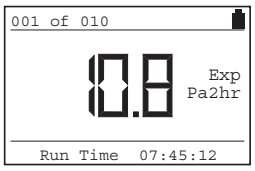


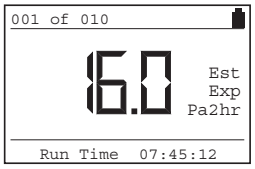


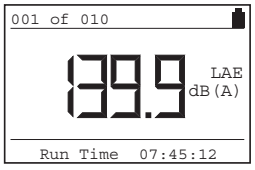


* 

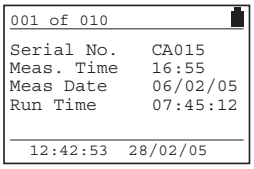
* 

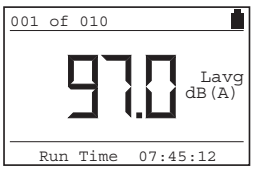
* 

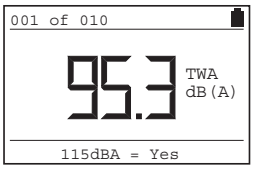
* 

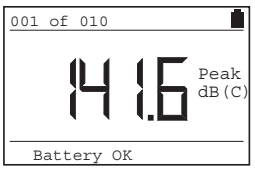
* 

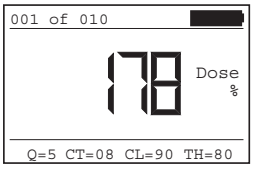
Lavg & TWA Measurement Data











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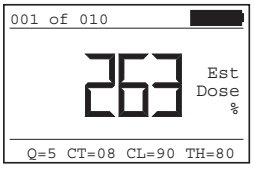

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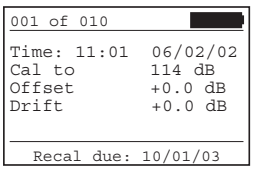
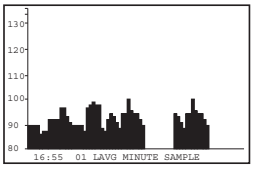




* These options can be turned off using dBLink3 software

Time History Display

The measured Time History Data is displayed on the Reader display.

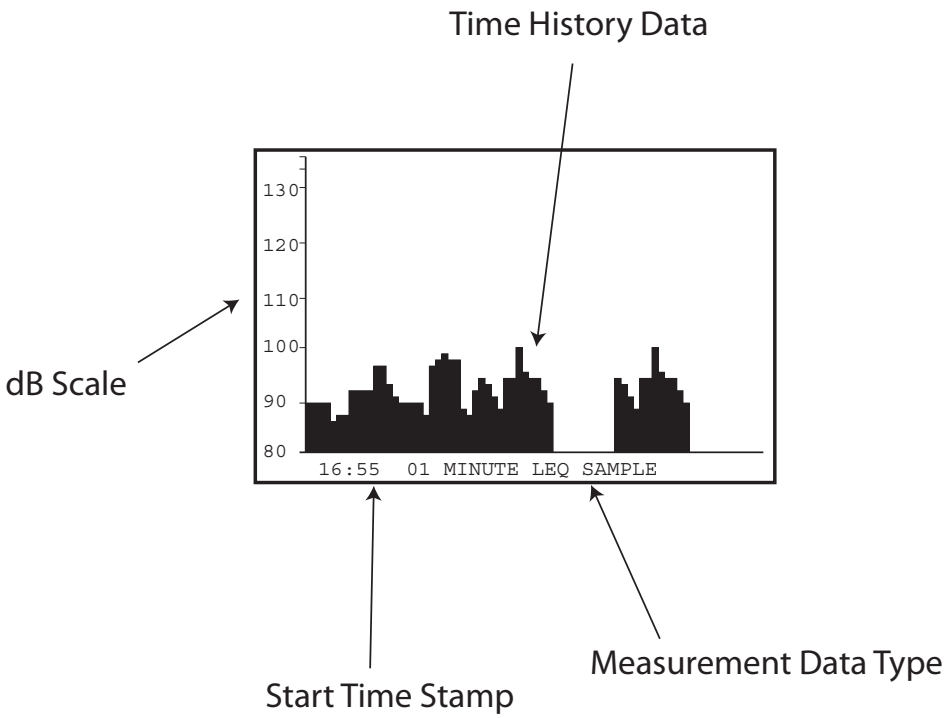
The Time History graph is drawn with a fixed range of 80dB to 130dB in 10dB steps with a marker at 133dB (for overload).

If the measurement was paused, the display will show a solid bar over the full height of the display.

The stored time history data is compressed into a sample size so that the entire time history will be displayed on a single graph. For example, a 3 hour 50 minute measurement will be displayed as 2 minute Leqs to allow all of the measurement information to be shown on the display.

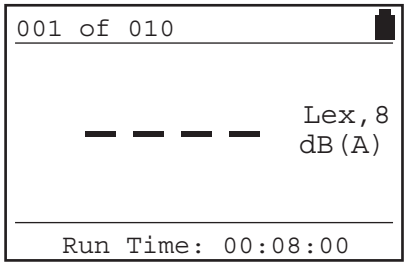
The graph also display the start time of the Time History and the sample size.

The figure below shows an example of a Time History measurement. The Time History display is either Leq for 3dB Exchange Rate, No Time Weighting and no Threshold, or L_{AVG} for any other configuration.



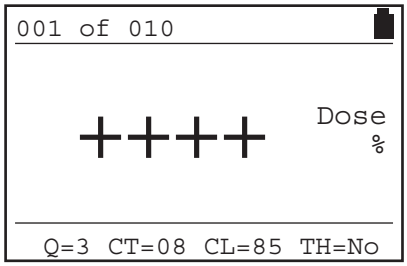
Other Information

Other information may be displayed by the Reader unit during the measurement review. These are covered below.



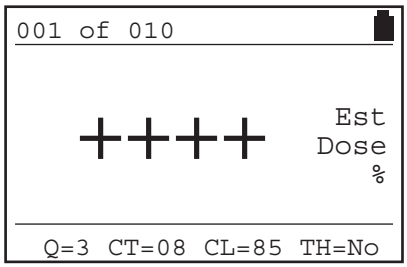
Shown when:

The Run Time and Leq are too low for the Reader unit to accurately calculate an $L_{EX,8}$ value.



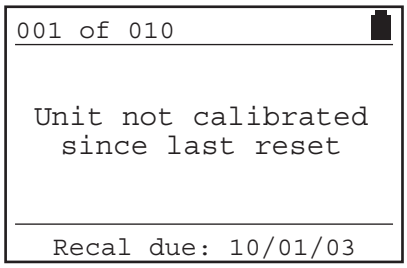
Shown when:

The value for the % Noise Dose is too large to be calculated.



Shown when:

The value for the Estimated % Noise Dose is too large to be calculated.



Shown when:

The doseBadge was not calibrated before the measurement was started.

Downloading measurements to a PC

Measurements that have been stored in the Reader unit can be downloaded to a PC using the dBLink3 software. dBLink3 is a simple program that allows measurements to be downloaded from the RC:110A Reader unit to a PC. The dBLink3 software automatically recognises an RC:110A Reader unit and allows measurements to be downloaded, saved as a basic text file and printed. The dBLink3 program also allows the measurement data to be passed to the doseBadge Database program.

dBLink3 and the dBase Database are supplied on a CD-ROM require a PC running Microsoft Windows98SE or later. A USB communications port is required for connection to the RC:110A Reader unit via the supplied USB Cable.

To install the software**:**

1. Insert the Disc in the CD-ROM drive
2. Follow the instructions on the screen

If the installation program does not automatically start, run d:\setup.exe program from the Start, Run option in the task bar where d is the letter of the CD-ROM drive.

Please note that if you are running on a network, you may need to contact your network administrator to ensure that you have sufficient access rights to install this software. This software should be installed with full administration rights to ensure that the configuration of the software can be completed.

Cirrus Research plc accepts no responsibility for the installation of this software on systems where full access rights are not available.

Connecting the Reader to a PC

The Reader unit must be connected to a PC to allow measurements to be downloaded to the software. The Reader unit is supplied with a USB Cable which must be used to download the information.

The USB Cable can only be inserted into the Communications socket in one orientation. If the connector will not fit into the socket do not force it. Ensure that the orientation of the connector is correct and that the arrow on the cable is pointing downwards.

When the cable has been connected to the Reader and the PC, ensure that the Reader is switched on. If the dBLink3 software program is running, it will automatically detect the Reader unit and allow the measurements to be downloaded.

If the connection is not automatically made, run the dBLink program from the Programs\Cirrus\dBLink3 directory.

Once the connection is made, the measurements can be downloaded. For more information, please refer to the dBLink3 and doseBadge Database help files provided with these programs.

Section 6 Maintenance & Care

Annual Verification & Servicing

It is strongly recommended that all doseBadges and Readers are returned to Cirrus or an authorised service centre at least every 12 months for verification, calibration and servicing.

This should only be carried out by Cirrus Research plc or a service centre authorised by Cirrus Research plc for the service and calibration of the doseBadge.

The date that the Reader and doseBadges are due for "recalibration" can be seen on the print-out and in data transferred to the computer.

Cleaning

The doseBadge, Reader and Keyfob should only be cleaned with a damp, lightly soaped cloth. No solvent based cleaners should be used as they may damage the doseBadge window or the case labels.

The doseBadge microphone grill must be protected against soiling as blocked grill holes can deteriorate the performance of the unit. Attempting to remove dirt from these holes with sharp implements can damage the sensitive membrane underneath.

The RC:110A Reader Unit should be cleaned with a damp cloth only. Ensure that the InfraRed port and the Acoustic Calibrator are free from damage and dirt. Do not insert any sharp objects into the Acoustic Calibrator.

Storing the doseBadge

If the doseBadge is left unused for a period of time longer than a few days, it is recommended that the doseBadge be fully charged. This will avoid any potential damage to the internal batteries through unwanted discharge.

If the doseBadge is not used for 1 hour, it will go into Sleep mode to protect the internal battery and to prolong the operating life. To use the doseBadge, the Shake-to-Wake sensor must be activated. Please refer to page 22 for details.

If the doseBadge is left unused, the internal batteries in the badge must be left charged. When fully charged and not used, the badge battery will remain charged for at least 14 days. If the unit is stored longer than this and the batteries are left to become totally discharged, THEY WILL EVENTUALLY BE DAMAGED.

To ensure optimum operation, doseBadges that have not been used for one month should be recharged.

To prevent damage please ensure that the doseBadges are recharged every 2 weeks (14 days).

Cycle Charge of the doseBadge Battery

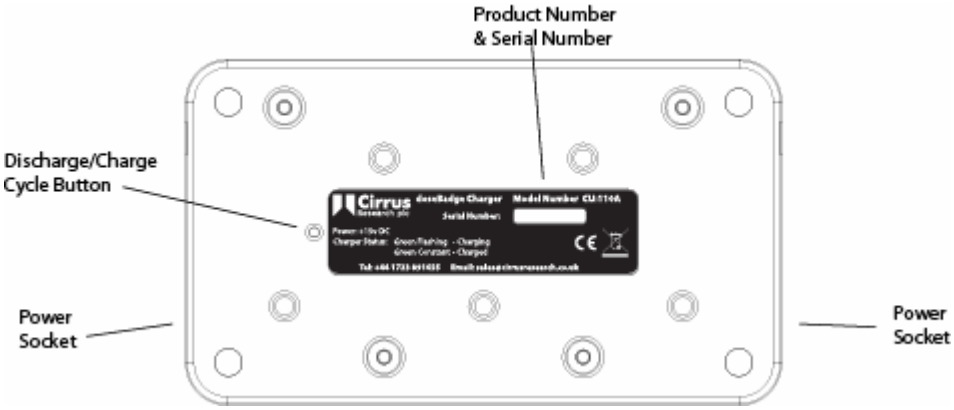
The CU:110A Charger Unit provides a Discharge/Charge cycle that allows the performance of the battery to kept at an optimum level.

This cycle fully discharges the battery before charging. Please note that this is not the normal operation of the CU:110 Charger Unit.

To carry our this charge cycle, connect the doseBadges to the CU:110A Charger and connect the power supply.

Press the Discharge/Charge cycle button located on the bottom of the charger as shown below.

If you press the button through the hole on the bottom of the charger, it will discharge all badges that are currently connected, then charge them. This can take up to about 6 hours depending on the battery type and initial charge state.



The internal NiMH (Nickel Metal Hydride) battery, like all rechargeable batteries, will self discharge. When arranged into a battery the individual cells within the battery, not being identical, will not all discharge at the same rate.

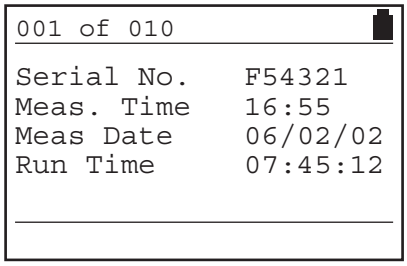
This means that the first cell to discharge may be forced into a 'reverse current' situation by the other cells and will be damaged. If the batteries are simply left discharged, there is no way of preventing this as the discharge is within the cell.

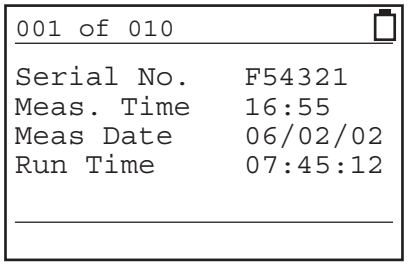
Even if they are removed from the doseBadge the self-discharge will still occur. To prevent this, it is recommended that the badge be charged monthly when not being used for measurements.

If the doseBadges are left on a charger without power, the doseBadges will discharge. To ensure that the doseBadges do not discharge, remove them from the Charger unit when the Charger is not connected to the power supply.

Changing the Reader Batteries

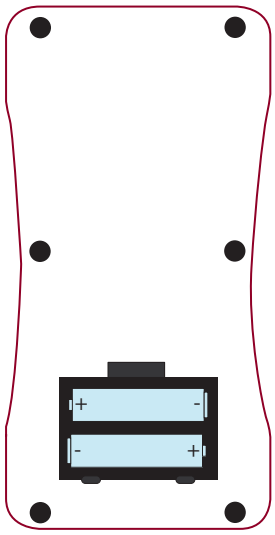
The doseBadge Reader unit shows the battery level in the top right hand corner of the display as shown below. The figure on the left below shows a full battery level and the figure on the right shows the battery level at 10% of the full capacity.





The batteries for the RC:110A Reader unit are located under the black cover on the back of the instrument. Before changing the main batteries, ensure that the Reader is switched off.

The memory of the Reader unit is protected when the batteries are removed. The clock of the Reader will be reset after 15 minutes when the batteries are removed.



Remove the battery cover and replace the batteries.

Ensure the correct polarity when replacing the batteries

Locate the battery compartment cover and remove it from the instrument.

Remove the batteries from the Reader unit and replace with batteries of equivalent type and quality.

The battery should be of alkaline type AA (LR6 / AM3 / MN1500 / Mignon).

Ensure that the polarity of the batteries is correct. Replace the battery cover and switch the Reader unit on.

Changing the RC:101A Keyfob Battery

When the red indicator of the Keyfob becomes dim, the internal battery requires changing.

Carefully remove the small screws on the back of the Keyfob, and lift off the back. Slide the battery out and replace with a Lithium battery type CR2025. This is not a rechargeable battery.

Ensure that the PCB is located correctly within the case and replace the back cover. Replace the two screws and secure the case.

Section 7 Troubleshooting

The following information is designed to solve common problems found when using the doseBadge system. If you cannot solve the problem, please contact your local representative or Cirrus Research plc directly. There are no user serviceable parts inside the doseBadge, Reader or Chargers.

The CR:110A doseBadge

Symptom	Possible Cause	Solution
The doseBadge will not Reset	The doseBadge has not been used for more than 1 hour and is in Sleep Mode	Wake the doseBadge by shaking. Refer to page for 22 details.
	The doseBadge battery is flat	Charge the doseBadge
	The InfraRed window on the doseBadge is not aligned with the InfraRed Port on the Reader	Align the InfraRed window on the doseBadge with the InfraRed Port on the Reader unit
The doseBadge will not Calibrate	The doseBadge has not been used for more than 1 hour and is in Sleep Mode	Wake the doseBadge by shaking. Refer to page for 22 details.
	The doseBadge battery is flat	Charge the doseBadge and then reset the doseBadge using the Reader Unit.
	The doseBadge is not pushed into the Acoustic Calibrator	Insert the doseBadge into the Acoustic Calibrator cavity on the Reader unit
	The InfraRed window on the doseBadge is not aligned with the InfraRed Port on the Reader	Align the InfraRed window on the doseBadge with the InfraRed Port on the Reader unit
The doseBadge will not Start	The doseBadge has not been used for more than 1 hour and is in Sleep Mode	Wake the doseBadge by shaking. Refer to page for 22 details.
	The doseBadge battery is flat	Charge the doseBadge and then reset the doseBadge using the Reader Unit.
	The InfraRed window on the doseBadge is not aligned with the InfraRed Port on the Reader	Align the InfraRed window on the doseBadge with the InfraRed Port on the Reader unit
	The Reader is too far away from the doseBadge	Move the Reader closer to the doseBadge and retry
	The communication between the Reader and the doseBadge was not completed	Ensure that the communication between the Reader and doseBadge is completed before moving the Reader unit.
The indicator does not show when the doseBadge is shaken	The doseBadge is already awake	Point the Reader Unit at the doseBadge and press the Stop key. The indicator will flash if the doseBadge is awake
The doseBadge runs for 1 minute and then stops	The doseBadge was not reset before the measurement was started. The low battery flag is still set in the doseBadge.	Ensure that the doseBadge was Reset before Calibration to clear the low battery flag.

There is no Time History data for the measurement	The Time History setting in the Reader is configured to Off.	Turn the Time History download function on

The RC:110A Reader

Symptom	Possible Cause	Solution
The Reader will not switch on	The Reader Batteries are flat	Replace the batteries in the Reader unit.
The Reader gives an error when Resetting the doseBadge: **"No Badge"**	The doseBadge battery is flat	Charge the doseBadge
	The InfraRed window on the doseBadge is not aligned with the InfraRed Port on the Reader	Align the InfraRed window on the doseBadge with the InfraRed Port on the Reader unit
	The ambient light is too high and is interfering with the Infra Red Communications.	Avoid using the doseBadge in very bright sunlight. Shield the Infra Red windows from very bright light.
The Reader gives an error when Resetting the doseBadge: **“Not Compatible”**	The doseBadge is a CR:100A or a CR:100B and the configuration is not supported by these units.	Change the configuration to suit the CR:100A or CR:100B doseBadges or use a CR:110A doseBadge.
The Reader gives an error when calibrating the doseBadge: **"No Badge"**	The doseBadge battery is flat	Charge the doseBadge
"Too Low"	The doseBadge is not pushed into the Acoustic Calibrator	Insert the doseBadge into the Acoustic Calibrator cavity on the Reader unit
	The ambient light is too high and is interfering with the Infra Red Communications.	Avoid using the doseBadge in very bright sunlight. Shield the Infra Red windows from very bright light.
The Reader gives an error when Calibrating the doseBadge: **“Not Compatible”**	The doseBadge is a CR:100A or a CR:100B and the configuration is not supported by these units.	Change the configuration to suit the CR:100A or CR:100B doseBadges or use a CR:110A doseBadge.
The Reader gives an error when downloading (Reading) the doseBadge: **"No Badge"**	The doseBadge battery is flat	Charge the doseBadge
	The InfraRed window on the doseBadge is not aligned with the InfraRed Port on the Reader	Align the InfraRed window on the doseBadge with the InfraRed Port on the Reader unit
	The ambient light is too high and is interfering with the Infra Red Communications.	Avoid using the doseBadge in very bright sunlight. Shield the Infra Red windows from very bright light.
The Reader gives an error when Reading the doseBadge: **“Not Compatible”**	The doseBadge is a CR:100A or a CR:100B and the configuration is not supported by these units.	Change the configuration to suit the CR:100A or CR:100B doseBadges or use a CR:110A doseBadge.
There is no Time History data for the measurement	The Time History setting is configured to Off.	Turn on the Time History download option

"Trace Error"	There has been an error during the download of the Time History Data.	
The Reader will not download to the software	The connection between the Reader and the PC is not correct	Ensure that the cable is connected between the Reader and the PC
	The Reader is not switched on	Switch on the Reader and try again
	The dBLink software is not running	Run the dBLink software from the Programs, Cirrus, dBLink directory and try again

The Chargers

Symptom	Possible Cause	Solution
The doseBadge will not charge	The power is not connected to the Charger	Ensure that the CU:195A Power Supply is connected to a supply and to the Charger unit
No lights appear on the charger unit	The power is not connected to the Charger	Ensure that the CU:195A Power Supply is connected to a supply and to the Charger unit
	The mains power supply is damaged	Contact your local representative
The Green charging light does not flash when the doseBadge is connected.	The doseBadge is not properly connected to the charger	Screw the doseBadge fully onto the charger unit
The charger unit is not charging the doseBadges		Perform a Power-on Self Test Database Press and hold the Discharge/Charge Cycle button and connect the power. Hold the button for 2 seconds. The LED charge indicators will flash in sequence then all of the indicators will show. If the LED charge indicators continue to flash, contact Cirrus Research plc or your local representative.

Section 8 Glossary & Terminology

The following section lists the acoustic terminology that is found in this manual and in the CR:110A doseBadge Personal Noise Dosemeter and RC:110A Reader Unit. For further information, please contact your local representative or Cirrus Research plc directly.

Terminology

The doseBadge and Reader can produce the following metrics as defined in the relevant standards. Some of these are available on the Reader display, others require a printer or the computer software supplied.

When the data is downloaded from the RC:110A Reader unit to the doseBadge software, the following parameters are provided:

L_{Aeq}

The level which, if maintained constant for the same period as the measurement, would contain the same amount of energy as the fluctuating noise level. "A" weighted and expressed in decibels (dBA). Doubling the energy results in a 3dB change in the L_{eq}. This is denoted by Q=3. The Threshold used in the calculation of L_{AVG} (see below) is not used for the calculation of L_{Aeq}.

For example:

If the noise level in a factory was a constant 85dB and the measurement period was 4 hours, the L_{Aeq} would be 85dB(A).

L_{AVG}

L_{AVG} is the average Sound Level over the measurement period when the exchange rate (Q) is other than 3dB or where there is a Threshold applied or a Time Weighting applied.

L_{AVG} is the equivalent of L_{eq} for exchange rates other than 3dB, for example Q=5. The Threshold value is used during the calculation of L_{AVG} with any levels below the threshold not being included.

For example:

Assume the threshold level is set to 80dB and the exchange rate is 5dB (which are the settings for OSHA's Hearing Conservation Amendment). If a one hour measurement was taken in an environment where the noise levels varied between 50dB and 70dB, the sound level would never exceed the threshold level and the instrument would record no value for the L_{AVG}. If the sound level exceeded the 80dB threshold for only a few seconds, then only these seconds would contribute to the L_{AVG} giving a level of around 40dB which is much lower than the actual ambient sound levels in the environment.

$L_{EP,d}$

The $L_{EP,d}$ is the average of the measured L_{eq} over an eight hour period. The $L_{EP,d}$ will be lower than the L_{eq} when the measurement duration is less than eight hours, equal to the L_{eq} for a measurement of eight hours, and higher than the L_{eq} for measurements over eight hours.

For example:

If a noise measurement was made for 4 hours and the L_{Aeq} value was 90dB(A), the $L_{EP,d}$ value would be calculated to be 87dB(A) as the measurement duration is half the Criterion Time of 8 hours and the exchange rate is 3dB.

$L_{EX,8h}$

Under the EU Physical Agents (Noise) Directive which will be introduced in member states of the EU by February 2006, the terminology for the Daily Personal Noise Level or $L_{EP,d}$ has been changed to be $L_{EX,8h}$. The calculation is the same and the data is calculated from the LAeq and Measurement Duration in the same way as for $L_{EP,d}$.

TWA

The Time Weighted Average is the average of the measured L_{AVG} over an eight hour period. The TWA will be lower than the L_{AVG} when the measurement duration is less than eight hours, equal to the L_{AVG} for a measurement of eight hours, and higher than the L_{AVG} for measurements over eight hours.

% Dose

A percentage of a fixed dose value based on the criterion level and criterion time. The criterion level and time are set by local standards.

For example, some Regulations may mandate the use of 85dB for 8 hours as the limit for a daily noise exposure. If the noise level was a constant 85dB for 8 hours, this would generate a % Dose of 100%.

Estimated Dose

Estimates the % dose (described above) that would have been received by the wearer if the average level measured had existed for the period defined by the criterion time.

For example, if for a 4 hour measurement the % Dose was 50%, the Estimated Dose would be 100% for the 8 hours of the Criterion Time.

Exposure (Pa5s, Pa5hr)

The noise exposure expressed in linear terms rather than using the logarithmic dB unit or % dose. Expressed in Pascal squared hours (Pa5hr) or Pascal squared seconds (Pa5s).

Estimated Exposure

Estimates the exposure (described above) that would have been received by the wearer if the average level measured had existed for the period defined by the criterion time. Expressed in Pascal squared hours (Pa5hr).

L_{AE} or SEL

The level which, if maintained constant for a period of 1 second would have the same sound energy as that actually received by the doseBadge during the measurement period. For example, if the measurement duration was 8 hours and the L_{eq} was 85dB(A), the L_{AE} would represent all of the noise energy over the 8 hour period Asquashed@ into a duration of 1 second. L_{AE} is the same as SEL (Sound Exposure Level)

Threshold

Sound Levels below the threshold are excluded from all averaging.

For example, OSHA measurements use an 80dB threshold and call for a hearing conservation program to be implemented when the eight hour TWA exceeds 85dB (50% dose).

Criterion Level (CL)

In dB, the normalised eight hour average weighted sound level the corresponds to the maximum permitted daily exposure or 100% noise dose.

Criterion Time (CT)

The time, in hours, used in the calculation of the % Dose and Estimated % Dose measurement parameters. By default, this is set to 8 hours but can be configured to other durations in the Reader unit.

Peak

The true peak level of the pressure wave (not the highest sound pressure level which is termed the L_{max}). The CR:110A doseBadge measures the true Peak level.

Overload

Indicated when the noise level exceeds the upper design limit of an instrument. In the doseBadge this is set to 130dB(A) Sound Level

Glossary

A Weighting	A standard weighting of the audible frequencies designed to reflect the response of the human ear to noise.
Acoustic Calibrator	An instrument that provides a reference noise source that is used to calibrate and check the performance of a Sound Level Meter.
ANSI S1.25:1991	The American (US) Standard for Personal Sound Exposure Meters (PSEM)
C Weighting	A standard weighting of the audible frequencies used for the measurement of Peak Sound Pressure level.
CE Marking	A label used to show that the Sound Level Meter conforms to the specification of a European Directive
dB(A)	Decibels A weighted

dB(C)	Decibels C Weighted
Decibel (dB)	The units of sound level and noise exposure measurement
Fast Time Weighting	A standard time weighting applied by the Sound Level Meter
IEC 61252:1993	The International Standard for Personal Sound Exposure Meters (PSEM)
Integrating Averaging Sound Level Meter	A Sound Level Meter which accumulates the total sound energy over a measurement period and calculates an average
L_{AE}	Sound Exposure Level (SEL) with “A” frequency weighting
$L_{Aeq,t}$	Equivalent continuous sound pressure level. A measure of the average sound pressure level during a period of time, t, in dB with “A” weighting.
L_{AS}	Sound level with “A” Frequency weighting and Slow Time weighting
L_{ASmax}	The maximum Sound level with “A” Frequency weighting and Slow Time weighting
L_{Cpeak}	Peak Sound pressure level with “C” frequency weighting
$L_{EP,d}$	Daily personal noise exposure as defined by ISO 1999. This is the $L_{Aeq,t}$ normalised over an 8 hour reference period. $L_{EP,d}$ assumes that the noise level for the rest of the 8 hour reference period is "quiet".
L_{eq}	Equivalent continuous sound pressure level. A measure of the average sound pressure level during a period of time, t, in dB
Overload	The input to the Sound Level Meter is too high for the current measurement range. Change the range
Peak	The maximum value reached by the sound pressure at any instant during a measurement period (in dB usually with C frequency weighting)
Personal Sound Exposure Meter	An instrument for measuring the noise exposure of a person
SEL	Sound Exposure Level, displayed as L_{AE}
Slow Time Weighting	A standard time weighting applied by the Noise Measurement Instrument
Sound Level	Sound Pressure Level with a Frequency weighting, such as dB(A)
SPL	Sound Pressure Level, the basic measure of noise loudness, expressed in decibels
Time History	A sample of the noise levels taken every 1 second throughout the measurement period.

Type 1	Laboratory & Field Grade for Sound Level Meters. Personal Noise Dosemeters to the IEC 61252 Standard do not have a Class or Type.
Type 2	General Field Grade for Sound Level Meters.Personal Noise Dosemeters to the IEC 61252 Standard do not have a Class or Type.
TWA	Time Weighted Average. The daily personal exposure level calculated from the L_{AVG} and the measurement duration. TWA replaces $L_{EP,d}$ in the OSHA Q=5 version of the doseBadge.
L_{AVG}	The continuous A weighted sound level measured over the measurement period with an exchange rate of 5dB. L_{AVG} replaced Leq in the OSHA Q=5 version of the doseBadge.
% Dose	The noise level measured expressed as a percentage of a fixed level. For example, the reference 100% level would be a continuous level of 90dB for 8 hours. The Criterion Time (CT) and Criterion Level (CL) are used for the 8 hours and 90dB level.
% Estimated Dose	The % Dose projected forward over an 8 hour duration, assuming that the noise level continued at the same level for the rest of the 8 hour reference period. The Criterion Time (CT) and Criterion Level (CL) are used for the 8 hours and 90dB level.
Exposure in Pa^2hr	The noise level measured expressed in as a linear term in Pa^2hr (Pascal Squared Hours). For example, a noise level of 94dB for 4 hours would be $1Pa^2$ x 4 hours (94dB = 1Pa) giving an Exposure of 4 Pa^2hr. The 8 hour period is taken from the Criterion Time (CT).
Estimated Exposure in Pa^2hr	The Noise Exposure above projected forward over an 8 hour duration, assuming that the noise level continued at the same level for the rest of the 8 hour period. The 8 hour period is taken from the Criterion Time (CT).

Appendix 1 Specifications

The CR:110A doseBadge Personal Noise Dosemeter and the RC:110A Reader Unit have been designed to meet the requirements of IEC 61252:1993 Personal Sound Exposure Meters and the ANSI S1.25:1991 Personal Noise Dosemeters. The CR:110A doseBadge and the RC:110A Reader unit must be used as a combination to ensure compliance with these standards.

Applicable Standards

CR:110A doseBadge
IEC 61252:1993 Personal Sound Exposure Meters
ANSI S1.25:1991 Personal Noise Dosemeters Class Designation 2AS-90/80-5

RC:110 Reader Unit
Internal Acoustic Calibrator to IEC 60942:2003 Class 2

Measurement Range (Typical)

70dB(A) to 130dB(A) RMS
120dB(C) to 140dB(C) Peak

Measurement Functions:

The CR:110A doseBadge and RC:110A Reader Unit support Dual Channel measurements. The measurement data is divided into three sections. In all situations the Overall Measurement Data is stored.

If the doseBadge is configured with Channel 1 and Channel 2 having identical parameters, the dBLink3 software will only display Channel 1.

Overall Measurement Data

doseBadge Configuration
Calibration Record
Measurement Duration
Highest Peak(C) Sound Level
Overload Exceedence
115dB(A) Maximum Sound Level Exceedence
Battery Status

Channel 1 Measurement Data

For 3dB Exchange Rate:
L_{Aeq}, $L_{EX,8h}$, L_{AE}, % Dose, Exposure (Pa^2h)
Estimated % Dose, Estimated Exposure (Pa^2h)

For 4dB & 5dB Exchange Rates (and configurations with Time Weighting or Threshold):
L_{AVG}, TWA, % Dose, Estimated % Dose

1 Minute Time History of:
L_{Aeq} (3dB) or L_{AVG} (4dB or 5dB)

Peak(C) Level
Battery Level

Channel 2 Measurement Data

L_{Aeq}, $L_{EX,8h}$, L_{AE}, % Dose, Exposure (Pa^2h)
Estimated % Dose, Estimated Exposure (Pa^2h)

Memory

The RC:110A Reader Unit can store the following measurement data:

With 8 hours of 1 minute Time History
Up to 93 measurements
With 12 hours of 1 minute Time History
Up to 64 measurements
With 24 hours of 1 minute Time History
Up to 33 measurements

Weightings

Frequency	'A' for all Sound Level measurements. 'C' for Peak Sound Pressure
Time	None or Slow

Exchange Rate

3dB, 4dB or 5dB

doseBadge Configuration

Channel 1: Independent User Configuration of:

Exchange Rate
3dB, 4dB or 5dB
Criterion Level
80dB, 85dB, 90dB
Criterion Time
8hrs, 12hrs, 16hrs, 18hrs
Threshold
None, 80dB, 90dB
Time Weighting
None, ‘S’ (Slow)

Channel 2: Preset to

Exchange Rate
3dB
Criterion Level
85dB
Criterion Time
8hrs
Threshold
None
Time Weighting

None

Power

CR:110A doseBadge
Internal NiMH Battery with intelligent charging system

RC:110A Reader
2 x AA/LR6

CU Series Chargers
CU:195A Mains Power Supply

Memory Backup	The memory of the RC:110A Reader is protected when the main batteries are removed.

Calibration

Internal Acoustic Calibrator to IEC 60942:2003 Class 2

Calibration Level	114dB
Calibration Frequency	1kHz

Output

doseBadge	Infrared to RC:110A Reader Unit
Reader	USB2.0

Dimensions

doseBadge	Microphone Apex 13.0mm, Base 47mm, Height 38mm
RC:110A Reader	160mm x 80mm x 38mm

Environmental

Temperature	-10^{o}C to +50^{o}C Operating -20^{o}C to +60^{o}C Storage
Humidity	Up to 99% RH Non-Condensing

Weight

CR:110A	45 gms (1.6 oz)
RC:110A Reader	400 gms (14 oz)

Software

The dBLink3 Download program and the dBase Database supplied as standard. Compatible with Microsoft Windows versions 98SE or later.

Appendix 2 Ordering Information

The doseBadge measurement kits can be ordered with standard numbers of doseBadges.

Number of doseBadges	Standard Measurement Kit
1	CK:110A/1
2	CK:110A /2
5	CK:110A /5
10	CK:110A/10

Additional or spare components can be added to a system. The following components are available:

CR:110A	doseBadge	
RC:110A	Reader Unit	
CU:195A	Mains Power Supply.	Specify UK, EU or USA Standard Plug
UA:100	doseBadge Windshield	
SP:125	Mounting Kit for doseBadge	
SW:100	dBLink3 Software & dBase Database Software	
RC:101A	Keyfob Remote Control	
CK:100	Carrying Case for doseBadge System	
CU:110A	5 Way doseBadge Charger	

Appendix 3 Resetting the doseBadge and Reader Unit

Resetting the doseBadge

If, in the event that the doseBadge does not respond correctly to commands from the Reader Unit and if all of the troubleshooting steps have been followed, this reset procedure can be followed.

This procedure should only be followed if the CR:110A doseBadge does not respond to commands from the RC:110A Reader Unit. Please ensure that all of the troubleshooting listed above has been followed before carrying out this procedure.

In particular, ensure that the section covering the Shake-to-Wake function has been read and understood.

Please contact Cirrus Research plc or your local distributor for further details.

The purpose of this procedure to perform a hard reset on a CR:110A (doseBadge). This procedure should only be followed, if you have been instructed to do so by Cirrus Research, on an individual unit.

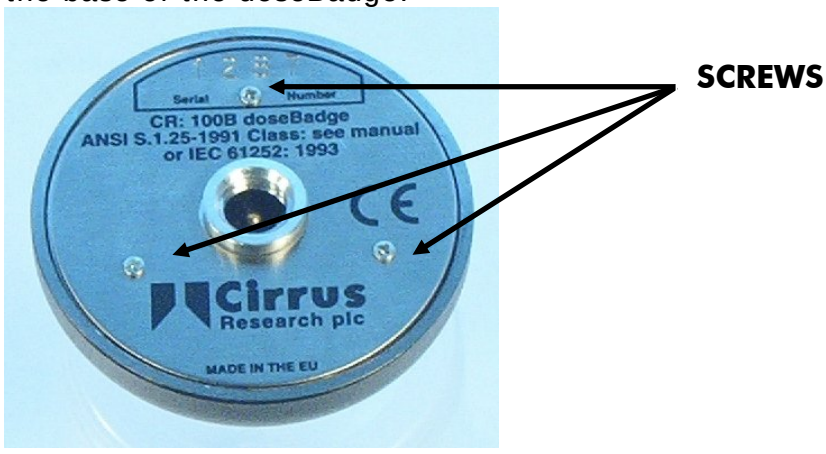
The actions described in this procedure should not erase any data from your doseBadge unit, but Cirrus Research plc do not take any responsibility for loss of data or any damage that occurs to your doseBadge from following this procedure.

Please fully read and make sure you understand the whole procedure before starting it. If you do not feel confident about following the procedure, please do not attempt it!

Warnings

This symbol is used throughout this procedure to indicate that special attention should be taken and any instructions followed carefully.

1. With a small, high quality Philips PH00 screwdriver remove the three screws from the base of the doseBadge.

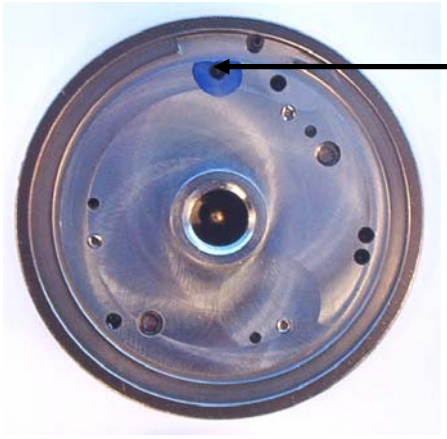


2. Place the metal label and three screws to one side.

These screws are extremely small and easily lost. Please place them in small container or similar.

3. Take a thin small metal object (a pin or bent open paperclip is ideal) and insert it into the hole highlighted blue in the picture below.

Care must be taken to insure that it is the correct hole. Use the locating pin in the case and the notch in the baseplate as a reference.



4. Move the metal object in the hole until you see the Blue LED flash through the optical window on the doseBadge. What you are trying to do with the metal object is connect the pin directly below the hole with the silver metal baseplate.

5. Insert the doseBadge into the calibrator cavity on the top of your doseBadge reader. Test the doseBadge is now communicating.

6. Place the metal label back onto the bottom of the doseBadge. Rotate the label until all three holes are lined up.

Care must be taken lining up the three holes. If all three holes are not lined up, rotate the metal label further. Inserting a screw into the incorrect hole could seriously damage your doseBadge!

7. Carefully place the three small screws through the holes in the metal label and screw them into the baseplate.

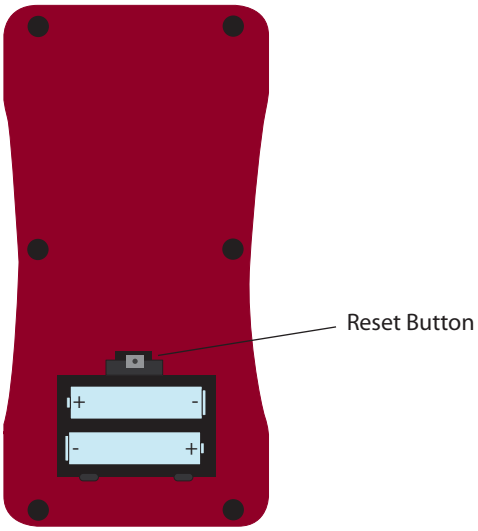
DO NOT over tighten the three small screws as damage to their heads will occur.

8. Place the doseBadge onto a CU:10xA charger, and allow the doseBadge to go through a full charge cycle before using.

Resetting the RC:110A Reader Unit

The RC:110A Reader Unit can be reset to the factory settings by pressing the Reset Button that is located within the Battery Compartment on the back of the Reader Unit.

Please note that this reset procedure will not clear the memory, and will only reset the internal microprocessor of the Reader Unit. This may be required if the Reader Unit has been stored without batteries for a long period of time and the internal backup battery is discharged.



Appendix 4 CE Certificate of Conformity

Cirrus Research plc Hunmanby UK
CE Certificate of Conformity

CE

Manufacturer: Cirrus Research plc
Acoustic House, Bridlington Road
Hunmanby, North Yorkshire, YO14 0PH
United Kingdom
Telephone +44 1723 891655

Equipment Description

The following equipment manufactured after 1st January 2006:

RC:110A doseBadge Reader Unit
CR:110A doseBadge Personal Noise Dosemeter
RC:101A Keyfob Remote Control Unit
CU:110A Charger Unit

Along with their standard accessories

According to EMC Directives 89/336/EEC and 93/98/EEC

meet the following standards

EN 61000-6-3 (2001)

EMC : Generic emission standard for residential, commercial and light industrial environments.

EN 61000-6-1 (2001)

EMC : Generic immunity standard for residential, commercial and light industrial environments.

Signed Dated 1st January 2007

S. O-Rourke
Director

Warranty Information.

1. This document is a summary of the full warranty document and explains the Cirrus Research plc warranty in ordinary English; not in legal or complex terms.

2. The warranty covers any acoustic instrument such as a sound level meter, acoustic calibrator, real time acoustic analyser or personal sound exposure meter (dosemeter) manufactured by Cirrus Research plc after March 1st 2007.

3. The warranty covers all faults on the instrument except the microphone and the display for the period defined in para (4) below, including minor accidental damage except to the microphone or display.

4. In common with almost all acoustic manufacturers, Cirrus Research plc do not give a warranty on the microphone or display – normally an LCD, because of their fragile nature.

5. The period of the warranty is 2 (two) years or 104 weeks from the date of purchase as a new instrument from Cirrus Research plc or their formally approved distributors OR 130 weeks from the date the instrument passed its final manufacturing inspection at Cirrus Research plc - whichever is the shorter.

6. Any rechargeable battery only has the battery manufacturer's one year warranty.

7. No warranty is offered for used equipment unless a special arrangement is made and a written confirmation of the warranty is given by Cirrus Research plc.

8. The warranty becomes void if the instrument is not returned for calibration within 18 months or 78 weeks of purchase. In the International Standard IEC 61672 this 'calibration' is described as "Routine Verification" and it is required to ensure that any acoustic instrument measures correctly.

9. On completion of the "Routine Verification" by Cirrus Research plc, the instrument will automatically be given an additional free one year warranty.

10. There will be a charge for this routine verification and the price is published in the Service Price List.

11. It follows that should the instrument be routinely verified by Cirrus Research plc every year, the warranty is effectively continuous to a maximum of 12 (twelve) years from the date of purchase.

12. Cirrus Research endeavour to ensure stocks of instrument components for the full twelve year period but do not guarantee to do so as certain components do become obsolete or discontinued.

13. If a sub-component becomes obsolete and stocks are depleted then Cirrus Research will endeavour to facilitate a repair but will not offer the same length guarantee.

14. In the event of any dispute on the terms of the warranty Cirrus Research plc will accept pendulum arbitration by the United Kingdom Institute of Acoustics Ltd.

15. The warranty does not in any way reduce any legal right of the buyer or user of the sound level meter; it is in addition to all legal rights determined by the European Union.

Cirrus Research Offices

The addresses given below are the Cirrus Research plc offices. Cirrus Research plc also have approved distributors and agents is many countries worldwide. For details of your local representative, please contact Cirrus Research plc at the address below. Contact details for Cirrus Research authorised distributors and agents are also available from the Internet Web site at the address shown below.

Main Office

Cirrus Research plc
Acoustic House
Bridlington Road
Hunmanby
North Yorkshire
United Kingdom
YO14 0PH

Telephone:	0845 23 0 2434
	+44 1723 891655
Fax:	01723 891742
e-mail:	sales@cirrusresearch.co.uk
Technical Support	support@cirrusresearch.co.uk
Web Site:	www.cirrusresearch.co.uk

Germany

Cirrus Research Buro Dresden
Schlueterstrasse 29
01277 Dresden
Germany

Telephone:	(+49) 351 316 0950
Fax:	(+49) 351 316 0949
e-mail:	vertrieb@cirrusresearch.de
Website	www.cirrusresearch.de